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Sentiment is More Cheerful

But Positive Developments Are Still Lacking—Pig Iron Production Low—Slight Increase in Inquiry in Some Lines

Improvement in financial conditions, slight increase in interest in buying on the part of pig iron consumers, continued demand for American machinery and steel products for export and a feeling that a more conservative influence will dominate the next congress as the result of Tuesday's elections have contributed to an improvement in sentiment in the iron trade. Orders of machinery for export include numerous lathes purchased by the Bethlehem Steel Co.; miscellaneous equipment placed with a New York house for shipment to Russia, France and England; large orders for automatic screw machines placed with the National Acme Mfg. Co., Cleveland; more than 100 lathes purchased by the Baldwin Locomotive Works for the Russian government; two large punches for Peru, ordered from the Cleveland Punch & Shear Works Co.; an additional order for four carloads of lathes placed with the Cincinnati Iron & Steel Co., and a number of lathes purchased for shipment to Sweden.

Pig Iron

An inquiry for 10,000 tons of basic for delivery during the first half of next year to the Portsmouth Steel Co. has aroused interest in Pittsburgh. In the east and also in Chicago and Cincinnati, there is a little improvement in inquiry, but prices are weak and very few orders are being entered. In the south, $10 is still the prevailing quotation on No. 2 foundry, but it is believed that this could be shaded on desirable business.

Pig Iron Production

Pig iron production in October was 1,769,385 tons, compared with 1,882,718 tons in September and 2,539,924 tons in October of last year. The average daily production was only 57,077 tons, the lowest since January, 1911, when the average daily output was 56,989. The lowest rate for many years was 33,657 tons in January, 1908. Iron ore shipments from the Lake Superior ranges for October were 4,242,392 tons, a decrease of 2,283,711 tons, compared with October of last year. The ore shipments to date are 30,951,805 tons, compared with 45,799,520 tons for the same period of last year. The movement for November will be about 1,000,000 tons.

Billets

Lower prices are being quoted on semi-finished material and some orders for billets for foreign shipment have been entered. An Ohio steel maker has taken an order for 4,500 tons for delivery at Liverpool.

Finished Material

The demand for barb wire for export continues heavy and the wire mills are busy. Some additional orders for ship plate for export have been booked, but domestic demand for plates is very light and prices are weak. Negotiations for important tonnages of steel bars for export are pending. Prices of steel pipe have been reduced from $1 on small sizes to $18 on the largest sizes. Cast iron pipe is dull and weak.

Coke and Scrap

Some furnaces are beginning to inquire for coke for delivery during the first half of next year. Heavy melting steel has been sold at $10, Pittsburgh, which is $1 lower than was ever accepted by leading jobbers in that district. Some extraordinarily low prices are being made in other sections. At Cleveland, heavy melting steel has been quoted below $9. Low prices, however, do not attract buyers.

THE OPEN HEARTH

Judge Gary's Address

THE address delivered by Judge Gary at Birmingham last Thursday deserves to occupy a prominent place in the history of the relations of this country to the great war. At a time when Europe is engaged in the bloodiest, most destructive conflict of all history, it was fitting that Judge Gary should again appear as the advocate of peace and fair dealing among business men, as well as among the nations of the earth. The theme was a familiar one to the statesman in business who had been the leader in the movement following the panic of 1907 to establish co-operation among the iron and steel manufacturers of the United States. Since that movement was abandoned in form, but not in spirit, Judge Gary has been attacked in court and elsewhere as a violator of the anti-trust law, but he has never wavered in the belief that he was right, nor have those who were associated with him for an instant regretted anything that they did in upholding his hands.

Judge Gary says that in his opinion the struggle for commercial supremacy was the underlying cause of the war, or at least had a decided influence upon its precipitation. His reference to the visit about three years ago of members of the American Iron and Steel Institute to Europe, and particularly to the sojourn in Belgium, was made with deep feeling and the Judge expressed the opinion that if the business men who met at Brussels could have had opportunity to consider and determine the questions which disturbed the nations of Europe, there would have been no war.

After speaking of the tremendous losses that are bound to come to all nations engaged in the conflict and showing that merciless competition is very much like the wars of nations, Judge Gary made a strong plea for the more unselfish method of conducting business and declared that the fundamental principles of the institute expressed by the words "conciliation" and "co-operation" must never be abandoned. The hearty applause with which these sentiments were greeted indicated that his hearers were thoroughly in sympathy with the speaker and we believe that the overwhelming sentiment of the country will be in favor of the Gary policies when they become thoroughly understood.

In spite of all the criticism that has been directed against great business concerns, Judge Gary's faith in his country is unshaken and he clearly points out how the United States can be firmly established as the leading country of the world. He has, however, no idea that this should be done by a policy of national selfishness or by disregarding the rights of any people in any nation. On the contrary, he declares that to the extent that this country prospers legitimately and without prejudice to the rights or interests of others, it may be able to render assistance to others who may need and are willing to accept it.

The iron trade is fortunate in having such a leader as Judge Gary, but his address is not for any one great industry; it is for the nation and the world. The utterance of such exalted, patriotic sentiments must have highly important influence in making the one great nation now at peace a power for good in the troubled affairs of the world.

Business Will Improve

NONE of the many managers and directors of iron and steel companies in attendance at the Birmingham meeting of the American Iron and Steel Institute last week was willing to make a definite prediction as to when business would show tangible improvement. On all sides it was felt that the conditions created by the war abroad were so unprecedented that the best anyone can do is to take up each day's problem by itself with the assurance that eventually the situation will become normal. On every hand, there was supreme confidence in the ability of the people of the United States to surmount every barrier and finally emerge triumphant from the most perplexing industrial difficulty that has confronted the country since the formation of the republic.

We firmly believe that the worst is over.

THE OPEN HEARTH

The drop in London exchange, the assurances of Great Britain that cotton cargoes in neutral ships will not be molested, the tremendous war exports of the past few weeks, the early opening of the Federal Reserve banks and the greater conservative influence in Congress resulting from Tuesday's elections are all favorable factors.

No one expects immediate prosperity; but gratification may be expressed over the great forward strides that have been made since war was declared, indicating that the day of our deliverance may not be far off.

The Ferro-Manganese Situation

NO PRODUCT connected with the iron and steel industry probably has developed so many interesting and important complications within a brief space of time as ferro-manganese. The reason for this of course is obvious because of the dependence which the steel industry of this country is obliged to place upon European sources of supply, due to the lack of sizeable deposits of manganese ore in this country. In 1913, the United States consumed 226,475 gross tons of ferro-manganese, of which 128,070 tons were imported. These figures do not include any product manufactured in electric furnaces in the United States, which would be negligible.

Various developments during the past three months have tended to increase the dependent position of the great majority of steel makers in this country chiefly upon England, which has been supplying by far the largest part of their needs. The exception to this condition is the United States Steel Corporation, which imports ore and manufactures its own requirements of ferro-manganese and, therefore, is more interested in the situation in foreign manganese ore than in the finished product.

Recent events lead to the suspicion that English producers, in addition to protecting their own sources of manganese ore supply, have not been unmindful to discouraging increased competition in ferro-manganese in this country. The recent sharp reductions of prices upon the alloy when there was much talk of increased domestic production for the market, and later the declaration of an embargo on manganese ore from India against this country, suggest such a two-sided policy. The Black Sea, now becoming a scene of conflict, more effectually tightens the outlet on Russian manganese ore, leaving Brazil as the only avenue of supply now open to the United States.

The report that England has decided to prohibit the exporting of ferro-manganese is the latest important development, and if it should prove true, serious inconvenience is likely to result to independent steel companies in this country. All the factors indeed indicate that the present disturbed condition of ferro-manganese will continue indefinitely and that England more than ever before will exercise practical control over the market in this country, so long as she dominates the seas.

What the South Needs

THE south is learning that one product, be it cotton or pig iron, is not a sufficient basis for permanent prosperity. Diversification is the life of the industry, and this applies in the south to the iron trade as well as to agriculture. For this reason, the efforts which are being made in Alabama by such concerns as the Gulf States Steel Co. and the United States Steel Corporation to manufacture a varied line of steel products are encouraging. In a measure, the difficulties standing in the way of steel manufacture in the south are the same as those confronted on the Pacific coast. The aggregate consumption is large, but the consumption of any one class of material usually is insufficient to support economical mill operations.

The south, however, has demonstrated that it can manufacture rails, bars and wire products successfully, and with unexcelled export opportunities it is expected that the next decade will witness a decided growth in the steel production of Birmingham and contiguous districts.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for November 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for Oct., 1914.	Average for Aug., 1914.	Average for Nov., 1913.
Bessemer pig iron, Pittsburgh..	$14.70	$14.85	$14.90	$16.09
Basic pig iron, Pittsburgh.....	13.45	13.75	13.90	14.09
No. 2 Fdy. pig iron, Pittsburgh	13.70	13.80	13.90	14.59
Northern No. 2 Fdy., Chgo....	13.00	13.50	14.00	15.00
Lake Superior Charcoal, Chgo..	16.00	15.75	15.75	15.50
Malleable, Bessemer, Chicago...	13.00	13.50	14.00	15.00
Southern No. 2, Birmingham...	10.00	10.00	10.13	10.50
Southern Ohio No. 2, Ironton..	13.00	13.00	13.38	13.56
Basic, eastern Pa.....	14.00	14.00	14.00	15.00
No. 2X Virginia furnace.....	12.50	12.50	12.50	13.00
No. 2X Foundry, Philadelphia..	14.50	14.50	14.75	15.50
Ferro mang., Balti.....	67.50	68.00	100.00	50.00
Billets, Pbgh.	19.00	20.60	20.00	20.87
Sheet bars, Pbgh.....	20.00	21.00	21.00	21.75
Steel bars, Chicago.....	1.28	1.30	1.36	1.48
Steel bars, Pittsburgh.....	1.10	1.17	1.17½	1.31
Iron bars, Philadelphia.....	1.20	1.20	1.20	1.37
Iron bars, Cleveland, local del'y.	1.20	1.20	1.20	1.35
Iron bars, Chgo. mill.....	1.00	1.05	1.07	1.15

	Today's prices.	Average for Oct., 1914.	Average for Aug., 1914.	Average for Nov., 1913.
Beams, Chicago	$1.28	$1.30	$1.36	$1.48
Beams, Pittsburgh	1.15	1.17	1.17½	1.30
Beams, Philadelphia	1.25	1.30	1.30	1.40
Tank plates, Pittsburgh.....	1.10	1.14	1.16	1.25
Tank plates, Chicago.....	1.28	1.30	1.36	1.43
Tank plates, Philadelphia.....	1.25	1.30	1.30	1.45
Sheets, blk., No. 28, Pittsburgh.	1.90	1.93	1.88	1.97
Sheets, blue an., No. 10, Pbgh.	1.40	1.40	1.37½	1.47
Sheets, galv., No. 28, Pbgh....	2.90	2.93	2.85	2.97
Wire nails, Pittsburgh.....	1.60	1.59	1.55	1.59
Connellsville fur. coke, contr...	1.65	1.67	1.80	1.81
Connellsville fdy. coke contr...	2.25	2.25	2.36	2.54
Heavy melting steel, Pbgh.....	10.25	10.75	11.50	11.00
Heavy melting steel, east'n Pa.	9.50	9.75	10.75	10.25
Heavy melting steel, Chgo.....	8.50	9.00	9.50	9.00
No. 1 wrought, eastern Pa.....	11.25	11.75	12.25	13.50
No. 1 wrought, Chgo.....	7.50	7.75	8.75	8.75
Rerolling rails, Chgo.....	9.75	10.00	11.25	12.00
Car wheels, Chgo.....	10.00	10.50	11.00	12.50

(For Additional Prices See Page 888.)

Portsmouth Inquiry for Basic

Would Buy Ten Thousand Tons for First Half of Next Year—Average Price of Steel Making Irons Lower for October

Pittsburgh, Nov. 3.—The Portsmouth Steel Co. has entered the market for 10,000 tons of standard basic for shipment the first half of 1915. While northern Ohio and valley stacks are interested in the inquiry, it is not improbable that the bulk of the tonnage will be placed in southern Ohio. Basic pig iron, in the valleys, is being offered at a range from $12.50 to $13.00, but the bulk of the tonnage recently sold has gone at the minimum figure. Negotiations involve one 1,000-ton lot and several smaller tonnages. Bessemer, named at $13.75, valley, has been quiet, buying being limited to small tonnages. The average price of Bessemer and basic in October was $13.9375 and $12.85, valley, respectively, according to figures compiled by W. P. Snyder & Co. These grades remained at $14 and $13, valley, for more than six months. Foundry grades continue dull and inactive, and no change is noted in position of prices. The Carnegie Steel Co. is operating 26 of its 58 furnaces. The freight rate from the Mahoning and Shenango valleys is now 95c a ton, 5c above the previous rate.

Philadelphia Market is Dull

Philadelphia, Nov. 2.—Another week of extreme dullness has prevailed in pig iron in this territory. Except for some recent transactions in low phosphorus iron, in which a spirited campaign for business is being waged due to the entrance of a new seller in the field, as previously reported, the quantities sold or inquired for have been of the odd and end class. A leading seller in this district has figured out from statistical reports on hand that total sales of merchant pig iron in the United States in October were about 12.5 per cent, or approximately one-eighth of capacity. In the low phosphorus market in this district, a Philadelphia steel maker is understood to have closed for several thousand tons and two other eastern Pennsylvania steel makers were buyers of small lots, including some misfit. Prices on standard analysis iron show a wide range, for while it is understood one seller has done $19, Philadelphia, on the larger tonnage, smaller sales at $20.50, Philadelphia basis, and higher are reported by makers. Lebanon grades remain $16 to $16.50, furnace. The Delaware River furnace, at Chester, which is taking up the manufacture of low phosphorus with foreign ores, is changing this week to this grade. Foundry iron is slow. The market at Philadelphia remains around $14.50 for No. 2X, but it is doubtful what would be done on an attractive tonnage, as the situation is soft. Buffalo makers continue to make some sales in this district at $14.45, delivered, or $12, furnace, for No. 2X. A buyer at Trenton who closed for a small lot of No. 2X reports having obtained this iron at $14.25, delivered. One of the Delaware river pipe makers is in the market for an indefinite tonnage and a Lynchburg, Va., pipe maker took 300 tons of Alabama No. 3 and forge on a $10 basis for No. 2. Basic remains stagnant. The Thomas Iron Co. is about to blow in its second Alburtis, Pa., stack, which will give it two furnaces in blast.

Prices Weak in New York

New York, Nov. 3.—Small requirements remain the usual basis of negotiations in pig iron between buyers and sellers in this district and in New England. In a few cases, however, the quiet solicitation by sellers of offers from the consumers has been rewarded by the placing before the furnaces of some good-sized lots and occasionally sales of as much as 1,000 tons are resulting. The larger business now being done is the product of the energy of salesmen in carrying the market to the buyers and since a suggested price as a rule is the method employed to attract

(*For complete prices see page* 888.)

the interest of the consumer, these orders are being negotiated at a low figure. In the matter of price, therefore, the current market remains weak and heavy. The going level at New Jersey tidewater points in this district continues from $14 to $14.25 for No. 2X, equivalent to $12 to $12.25, furnace at Buffalo, and to approximately $13.25 to $13.50, eastern Pennsylvania furnace. A New Jersey stove maker has been buying some iron taking 500 to 1,000 tons for deliveries running into next year and may buy 1,000 tons or more additional. The Lackawanna railroad closed for 520 tons of foundry grades for Scranton, Pa., which went chiefly to Buffalo makers. A sale of 1,000 tons of eastern Pennsylvania forge iron recently was made to a New Jersey buyer. Small sales also have been made at Paterson and other points. A Delaware river pipe maker recently took 1,000 tons of low grade Central Pennsylvania iron at $13.85, delivered. Virginia makers are preparing to file a supplemental petition with the Interstate Commerce Commission to clear up the mixed freight rate situation in New England and to provide that the reduced tariffs, particularly the all-rail rate of $3.25 to Boston common points, apply to all railroads and not to merely the New Haven road as at present.

Slight Improvement

Cincinnati, Nov. 3.—A slight increase in both sales and inquiries can be noticed, principally because furnaces are beginning to take business for the first quarter at present day prices. Southern and southern Ohio No. 2 foundry can now be had at $10, Birmingham basis, for the former, and $13, Ironton basis, for the latter, for the first quarter, but furnaces have refused to sell at these figures beyond the first of April. These prices also prevail for the last quarter of this year. Inquiries, however, are mostly for small lots, rarely exceeding 400 or 500 tons, but they are a little more numerous. A melter in St. Louis is inquiring for 1,200 tons of southern foundry iron and another lot of 500 tons of the same grade is wanted by a Kentucky melter, shipments for both to extend into the first quarter. There are also several inquiries here of from 200 to 300 tons for charcoal iron for delivery into different parts of this territory.

St. Louis Inquiry

St. Louis, Nov. 2.—An inquiry for 1,200 tons of pig iron, southern and northern, for delivery in Quincy, Ill., over the first quarter of next year, made its appearance in the St. Louis market Monday morning. The inquiry for 200 tons of southern iron put out last week has not been closed. With these exceptions, business has been confined to car lot sales and inquiries, and very few of them. Southern No. 2 is quoted at from $10 to $10.25, Birmingham basis. Northern iron is held at $13.50 to $14, Chicago, and $13 to $13.50 Ironton.

Iron Moving More Freely

Chicago, Nov. 3.—Some sellers of pig iron are experiencing an increased inclination on the part of melters to take iron on which shipment has been deferred. One seller in this city finds shipments in October were a substantial percentage larger than in September.

Not much increase in sales is evident, though there has been some larger buying than prevailed in September. With almost all melters covered by contracts on which shipments have been held up, it is difficult to find a place to sell further.

It is estimated that merchant stacks in this vicinity have from 75,000 to 100,000 tons of iron in their yards and foundries also have considerable stocks on hand.

Merchant stacks are holding their prices at $13 to $13.50, Chicago furnace, for No. 2 foundry, but another interest is making practically an open quotation of $12.75, furnace, for No. 2 foundry. Although verification is lacking that sales have been made at 25 cents lower than this, a quotation of $13, delivered in Chicago, with a switching charge of 50 cents, has been made on some municipal tonnage, which figures back to $12.50, furnace, for No. 2 foundry. No award has been made on this business.

A South Bend melter has taken 100 tons of 8 per cent Jackson county silveries at a price said to be $15.75, furnace, which is 25 cents under the prevailing quotation.

The city of Chicago has taken bids on 1,050 tons of northern and southern foundry iron of Nos. 1 to 3 for December and January delivery for the municipal foundry. Bids of $13 and $13.75, delivered, were made on northern No. 2 and of $14 and $13.75 on southern No. 2. Thirty days are allowed in which to make awards.

Might Shade $10

Birmingham, Ala., Nov. 2.—Reasonably large inquiries for pig iron would see No. 2 foundry shaded considerably, it is freely admitted, from its present quotation of $10, Birmingham. Reports are heard of sales being made for $9.75, but no confirmation will be given by furnace men.

Ten dollars is the prevailing quotation for delivery through the rest of the quarter. One company, however, is quoting $10 for immediate delivery and $10.25 for the rest of the quarter. Furnaces are active, but it is stated that several will be shut down in the near future.

No tonnages of any consequence have been sold during the week. One local company is working on an order for the Japanese government, it is said, but nothing definite has materialized.

Buffalo Sales 35,000 Tons

Buffalo, Nov. 3.—The sales of the furnaces in the Buffalo district amounted to fully 35,000 tons in the past week, covering all grades, and including a large tonnage of low silicon iron, placed, it is said, by one of the Western New York producing interests at $12, f. o b. furnace.

Prices are softer than they were a week ago and have undergone a sag of about 25 cents per ton. Differentials have practically disappeared between grades. The range of prices is contracted, ranging from $12.00 to $12.50, f. o. b. furnaces. These are the approximate prices being accepted by most interests in the district while some are quoting slightly higher figures. The sales are confined largely to last quarter deliveries, or virtually immediate shipment iron. Producers are not disposed to book business on the present low prices for deliveries beyond the end of the year.

Tin Plate Prices Vary

Pittsburgh, Nov. 3.—No announcement has been made with reference to the price of tin plate for the 1915 season, and it is not believed that any definite action will be taken until the latter part of the month. Material is being sold at rather wide ranges in price, manufacturers quoting according to ability to make deliveries. Mills in need of additional tonnage have been offering decidedly low figures. The market is nominally represented by a spread from 3.25c to 3.40c.

Bolts, Nuts and Rivets

Pittsburgh, Nov. 3.—Bolts, nuts and rivets are selling at wide ranges in price in this territory, and circular quotations on all three products are considered nominal. Structural rivets are going at 1.45c.

The Associated Foundry Foremen of New York and vicinity held their regular monthly meeting at the Hotel Chelsea, New York, on Oct. 31. William M. Wilson, of the Black Products Co., Chicago, was the speaker. The subject of his talk was "Molding and Core Making".

(*For complete prices see page* 888.)

Sheet Prices

Are Being Shaded and Demand is Very Light

Pittsburgh, Nov. 3.—After a slight improvement in specifications, the market for steel sheet products again is dull and inactive. Specifications last week were lighter than those for the preceding 6-day period, and new orders involved no tonnages of importance. Leading makers continue to ask 2c and 3c for base size black and galvanized sheets, but those figures frequently are being shaded $2 a ton. Some mills are in need of additional tonnages, which accounts for the reports of rather low prices in isolated cases. Mills are not running at more than 60 per cent of capacity, and many of them are below 50 per cent of capacity.

Newport Mills Reopen.

Cincinnati, Nov. 2.—The plants of the Newport Rolling Mill Co. and the Andrews Steel Co., Newport, Ky., which are operated in conjunction, have reopened after a shutdown of three weeks and are both operating full force, employing a total of about 1,500 men. This company has received several good orders during its period of inactivity. Another large rolling mill in this territory reports that it is operating at about 70 per cent of capacity and another states that its operations are limited to about 55 per cent. The sheet business in this territory is very quiet, with orders scattering and usually for small tonnages. Despite rumors from surrounding territories of reductions in prices, mills here are quoting 2.15c on black sheets No. 28 gage, 3.15c on galvanized No. 28 and 1.60c on blue annealed No. 10 gage, all Cincinnati basis.

Prices Untested

Cleveland, Nov. 3.—The sheet market in the Cleveland district is so very dull that prices are entirely untested. No doubt is entertained, however, that the nominal quotations could be shaded and that less than 1.90c on No. 28 black and 2.90c on No. 28 galvanized, Pittsburgh, could be done.

Weak at Chicago

Chicago, Nov. 3.—The sheet market, which has shown elements of strength beyond other finished steel products, apparently is settling into the same situation as plates, shapes and bars. Tonnages on mill books have been worked down to a point where they are much smaller than a month ago and during the past month so small a tonnage of new business has been booked that the end is not far distant. The leading producer in this territory is operating about 40 per cent and expects to lessen this shortly. No. 28 gage black and galvanized are quotable at 1.99c to 2.09c and 2.99c to 3.09c, Chicago mill.

Cut Operations in East

Philadelphia, Nov. 2.—A further backwardness of the sheet market in eastern Pennsylvania is to be noted. The tonnage being entered by makers which only a few weeks ago justified capacity operations now is down to about 60 per cent of full. Operations accordingly are being reduced. The Alan Wood Iron & Steel Co. this week is running but three of its five sheet mills and has taken off another open-hearth furnace, giving it three active out of nine. The usual price quoted remains 1.55c, Philadelphia, or 1.40c, Pittsburgh, for No. 10 gage, but it is believed makers would not stop at this figure to obtain a large order.

Disposed to Buy

Buffalo, Nov. 3.—There is a disposition on the part of users of sheets and tin plate to come into the market with inquiries for the purpose of feeling out the situation regarding the possible placing of 1915 contracts. They are endeavoring to place orders on present prices but the mills are not inclined to negotiate with them at such figures under existing conditions.

Not Believed

That England Will Prohibit Exports of Ferro-Manganese

New York, Nov. 4. (By wire.)—No official confirmation has been received regarding the report that Great Britain has forbidden all exports of ferro-manganese. Direct representatives in this country of English producers have received no advice to this effect and cables received today cast much doubt upon the existence of such a ban on shipments. One representative was advised today by English makers by cable of the shipment of 2,000 tons going forward from Liverpool, this week, and another received information pertaining to lots to leave England during the next three weeks. In the best informed circles on ferro, the report of an embargo is not credited and it is believed the message cabled here Monday must have resulted from some confusion.

Report by Cable.

New York, Nov. 3.—A Philadelphia seller Monday received a cable from a firm of London merchants conveying the information that the British government had forbidden all export shipments of ferro-manganese. The agents in this country of English makers of ferro-manganese up to that time, however, had not been officially notified of this action and the absence of formal advice in these channels on so important a matter raised considerable doubt as to just what had been done and as to how far it would apply to the market in the United States. This uncertainty has not been cleared up as yet.

It is believed that if an embargo has been laid on ferro-manganese shipments to this country, it arises from the efforts of the English government to shut off any re-export deliveries from the United States to Europe with the possibility of their finally landing in the hands of German or Austrian consumers. Considerable foreign inquiry for ferro-manganese recently has been coming to this country and sales to Sweden and Australia have been closed as previously reported. The suspicion has been raised that the material purchased for Sweden was intended finally for another destination. Italy also still is in the market and has increased its inquiry to 1,000 tons. It develops that a sale of 200 tons made by an eastern Pennsylvania steel maker to an Australian steel works, previously reported, was done at a price of $68, seaboard. It had been reported that this transaction was made at $70, and while such a figure was quoted, the sale, it now is learned, was closed at the regular price of English makers. Australia also is in the market for 100 tons of fluor spar and for a small lot of 75 per cent ferro-silicon. The domestic market on ferro-manganese remains inactive.

Alloys Still Drag

Pittsburgh, Nov. 3.—The market for ferro-manganese and ferro-silicon in western Pennsylvania and eastern Ohio continues to border on stagnation. Consumers manifest no interest in the future, and no sales have been made in the open market for prompt delivery, so far as can be ascertained. No reports of shading are heard.

Trucks for Export

Hartford, Wis., Nov. 3.—President George A. Kissel, of the Kissel Motor Car Co., who is in New York, has wired a rush order for 25 Kissel trucks of the 2½-ton type to the factory and overtime operations have been instituted to complete the order. A few weeks ago the Kissel company shipped fifty 2½-ton trucks to Athens for the war department of the government of Greece. The destination of the rush order was not stated in the wire from New York.

(*For complete prices see page* 888.)

Steel Bar Specifying

Is Very Slow and There is Little Buying—Prices are Fairly Well Maintained

New York, Nov. 3.—Some very large negotiations for soft steel bars for shipment to Europe continue to go forward and early action is expected on these matters. These bars are desired for ammunition manufacture. Several different inquiries of this character are pending, among others one for Greece, and exporters have been making some inquiry for a round tonnage of bars for Italy. Beyond these foreign negotiations, there is small activity in the bar market in this district. New buying is light and specifications in October, while with some producers, have been a little ahead of September, are much below normal. A New England manufacturer of ammunition has been inquiring for 250 tons of 4½-inch rounds. About 1,000 tons of reinforcing bars will be required for a public bridge at Portland, Me., bids for which are going in this week. The Amoskeag Mfg. Co., Amoskeag, Me., will require about 750 tons of reinforcing bars for plant extensions. Bar prices remain unchanged at 1.31c, New York, or 1.15c, Pittsburgh, but not enough business is being done to test their firmness, though lower is indicated on a desirable order.

Manufacturers Take Bars Slowly

Philadelphia, Nov. 2.—Manufacturing consumers of steel bars in this territory are buying or specifying on a low scale which is estimated by makers at about 25 to 30 per cent of normal. The jobbing trade is making a better record though this is considerably below normal and its stocks are reported to be fairly liberal. The market accordingly continues slow. An eastern Pennsylvania steel maker is in the market for 300 tons of high carbon bars of one size. Some lots for export continue to receive attention from makers. While 1.30c, Philadelphia, or 1.15c, Pittsburgh, continues the usual quotation on the miscellaneous offerings of the present market, it is believed 1.25c, Philadelphia, or 1.10c, Pittsburgh, could be done on an attractive specification.

Small Business in Chicago

Chicago, Nov. 3.—Steel bars, in common with other finished steel products, are practically dead. The market has narrowed so decidedly within the past 30 days that practically no business is being booked at present. Mills are operating at a low percentage and prices remain at 1.29c to 1.34c, Chicago. Local business for Chicago proper can be obtained at 1.25c. Practically every industry using steel bars seems to have cut down to the point where further supplies are unnecessary and orders are few and far between. Makers are of the opinion that lower quotations would not start business moving and there is not sufficient to cause competition.

Iron Bars Stationary

Chicago, Nov. 3.—The only change apparent in the iron bar situation is a slackening of business and mills are operating simply from day to day on such business as can be obtained. The leading maker of iron bars in this vicinity continues full operations, but indications are a partial shutdown may be necessary at any time. While the quotation remains at 1.00c to 1.05c, Chicago, some makers are shading their extras rather than lessen the base price and while this holds the quotation at the present level, the fact is it is being shaded. However, so little tonnage is obtained for this product that it is scarcely worth while making a price offer lower than present quotations, as this action has failed in many cases to develop orders.

Prices Weaker

Buffalo, Nov. 3.—Prices have undergone a slight decline in the past week with reference to bars and shapes. Mills and agencies of the Buffalo district are asking 1.15c, base, for deliveries over the remainder of the quarter and where specifications run into good tonnage with early shipment orders, it is understood that the price is 1.10c, base. The mills are not disposed to sell at these figures for needs beyond the end of the year. The buying that is being done is of a hand to mouth nature, representing only the actual immediate needs of the manufacturers and the jobbers.

Reports from Canada indicate that the situation across the border is quiet and that the manufacturers using bars and shapes are running on a basis of about 30 to 50 per cent.

Hoops, Bands, Shafting

Pittsburgh, Nov. 3.—Specifications for hoops and bands last month fell off in volume, and prices are sentimentally weaker than 30 days ago. Bands are listed at 1.15c and hoops at 1.25c. Cold rolled shafting is quiet. An attractive tonnage probably could be obtained at 67 off list, or less.

Demand for Barbed Wire

For Shipment to Belligerent Nations is Heavy —Domestic Buying Light

Pittsburgh, Nov. 3.—Demand for barbed wire, for shipment to belligerent nations, continues heavy. Pending inquiries involve 50,000 tons of barbed wire, and orders placed with mills in this territory the last week or 10 days have been heavy. Larger mills are unable to promise deliveries of barbed wire before Dec. 1. Foreigners continue to buy nails, but not so heavily as wire. The domestic situation is unsatisfactory, and were it not for the export trade, conditions in this branch would be much the same as those in other lines. Prices are well maintained, but there is no snap to the market.

Barb Wire

Philadelphia, Nov. 2—Sellers of wire products in this district have received some large inquiries the past week for barb wire for export. There have been several of these, some of them calling for 10,000 tons, and others for 5,000 tons and less. While prices were asked f. a. s., New York, it generally is understood that this wire is for the allied armies in Europe. The government took bids this week on 1,500 kegs of wire nails for the Panama canal.

Manufacturers Specify

Cleveland, Nov. 3.—Until very recently, the specifying by jobbers has been heavy and that of manufacturers comparatively light, but this is now reversed and manufacturers are sending in specifications more freely. Mills in the Cleveland district are operating at about 75 per cent of capacity and prices are being well maintained.

The plant of the American Steel Foundries at Sharon, Pa., was closed down Nov. 2. The company has closed several of its plants within the last two months.

(*For complete prices see page* 888.)

Ship Plates Booked

For Export, But Tonnage Not Large—Prices in Some Sections Show Weakness

Philadelphia, Nov. 2.—Recent easiness of prices of plates in eastern Pennsylvania and vicinity has continued until the market now is quotably $1 lower. The larger and more desirable specifications now are bringing out 1.25c, Philadelphia, and 1.10c, Pittsburgh, because of the slack condition of the mills, though the smaller orders still are going at 1.30c, Philadelphia, or 1.15c, Pittsburgh. Mill tonnage does not improve and continues irregular, some days being good and others exceedingly lean with eastern Pennsylvania producers. The average operations are less than 50 per cent. Some additional small orders for export, principally ship plates for England and Scotland, have been taken by eastern mills. The large pipe line inquiry for 13,000 to 16,000 tons for Coalgardie, Australia, remains pending and there is some talk that this work has been held up temporarily.

Hot Rolled Lose Ground

Pittsburgh, Nov. 3.—Hot rolled steel products present a weak front in all sections of the country. Mills are nominally quoting plates, shapes and bars at 1.15c, but indications are that no difficulty would be experienced in shading that figure for prompt delivery, if attractive tonnages were involved. Structural shapes appear slightly stronger than bars or plates. Mill operations continue at low ebb, with some estimates running below 40 per cent of capacity. Specifications against contracts in October were the lightest in many months.

No Business in Chicago

Chicago, Nov. 3.—The situation with steel plates is particularly dull. As mentioned previously, car buying is at such a low ebb that this important outlet for plates is taking practically nothing and other industries usually using considerable tonnage are running on a low scale and are not taking their usual quantities. Plate mills in this territory are idle several days each week and in some instances are not operating for a week at a time. Quotations remain 1.25c to 1.34c, Chicago, but these are practically nominal under the circumstances.

Some Work Resumed

New York, Nov. 3.—The resumption of some structural work in this territory, which had been held up, is releasing some fair specifications for plates to eastern Pennsylvania mills. One of these orders calling for considerable tonnage is the large subway terminal station of the Public Service Corporation at Newark. The Lehigh Valley railroad, which has been figuring on three car floats, about 500 tons each, is understood to have placed the order. An eastern Pennsylvania maker has taken a small order for plates for shipment to Honolulu, Hawaii, for sugar plant construction and other lots for foreign delivery are receiving attention, though few orders are resulting. Generally speaking, the plate market is very slow and it now is indicated that a buyer with a desirable specification would not have to pay over 1.26c, New York, or 1.10c, Pittsburgh, as the undertone is weak.

Lower Prices on Billets

Are Being Quoted—Some Sales Made for Shipment to England—Sheet Bar Inquiry from Glasgow

Philadelphia, Nov. 3.—Prices approximately $19, Pittsburgh, or $21.40, Philadelphia, have appeared on rolling billets in this territory, makers being obliged to do this figure to clinch desirable orders. In some cases, this business has been quietly placed and has called for round tonnages. The more open market on rolling billets is $21.90, Philadelphia, or $19.50, Pittsburgh, and $3 to $4 higher for forging steel. There is no general buying of billets among consumers in this territory and market conditions are sluggish. Eastern Pennsylvania makers have closed several orders totaling a few hundred tons of trial lots of billets for shipment to England in response to repeated inquiries recently received. The prices have been made attractive because of the purpose of the sales as, it is thought, this introduction of material to consumers abroad may open profitable relations. An Ohio mill also has made sales to England. Considerable export inquiry for semi-finished steel continues to come out. A new inquiry asks 3,000 tons of sheet bars for Glasgow.

Ohio Steel For Export

New York, Nov. 3.—An Ohio steel maker has taken an order for 4,500 tons of billets and slabs for shipment to Liverpool. The price is reported to have been about $20, eastern seaboard. Some other lots of semi-finished steel are pending in this district, principally for shipment to Great Britain, but not many orders are being taken.

Drop at Pittsburgh

Pittsburgh, Nov. 3.—Sales of sheet bars at $20.50, Pittsburgh, last week offered tangible evidence of the position occupied by the market for billets and sheet bars in western Pennsylvania. Tonnages figuring in transactions at that figure were light, and it is apparent attractive lots can be obtained in the Greater Pittsburgh district at $20, mill. We quote billets at a range from $19 to $19.50 and sheet bars at $20 to $20.50, Pittsburgh and Youngstown. Forging billets are nominally listed at $25; wire rods are listed at $26 and muck bar at $27 to $28, Pittsburgh.

(*For complete prices see page* 888.)

Store Business Good at Chicago

Chicago, Nov. 3.—Warehouses in Chicago find business unusually brisk, although practically nothing is being bought for construction, as that department has been unusually dull for some time. Increased activity is met in demand for plates by boiler makers, as preparations for winter are being made and steam plants are being put into better condition. Sheet metal workers also are taking considerable material for roofing and cornice work, as business structures are being finished before cold weather. Taken as a whole, warehouses report business active although not up to the market of previous years.

Re-Inforcing Bars in Demand

Cincinnati, Nov. 2.—Warehouse business continues slow with no variation during the past month. Twisted concrete re-inforcing bars continue the best in demand, as concrete contractors are anxious to get their building operations as far advanced as possible before the cold weather sets in, and are asking for prompt deliveries. Business is about evenly distributed among the other materials carried by local dealers. Prices have not changed and show no tendency to do so.

Scrap Breaks Records

In Western Pennsylvania by Descending to Lowest Prices in Many Years—Demand Light

Pittsburgh, Nov. 3.—Iron and steel scrap in western Pennsylvania and the valleys is selling at the lowest figures reported in many years, and numerous records have been broken. Heavy melting steel, held at $10.50 by some middlemen, has been sold at $10, or $1 a ton below the lowest price ever accepted by some of the larger jobbers. Demand is light, and specifications are unsatisfactory. Despite low prices, consumers show no interest.

Small Hope to Export Scrap

Philadelphia, Nov. 2.—Unusually dull conditions and weakness of prices still characterize the eastern Pennsylvania market for old material. Both buyers and sellers continue to pronounce the depression almost unprecedented. Because of the extremely low prices, some thought has been given to the opportunity for exporting scrap, particularly to Italy, which frequently has been a buyer in the past. The Italian market, however, also is low, and as freight rates are high, there is little hope of much exportation at present. Heavy melting steel, generally quoted remains at $9.50, delivered eastern Pennsylvania, though, as previously noted, some lots under pressure have gone lower. A sale of unsheared boiler plate was made at $8.50, delivered. Sales are noted of steel axles at $13, No. 1 forge at $8.25 and special stove plate at $9, all delivered eastern Pennsylvania. Buyers are offering $9.50 for wrought pipe and $8 for turnings. The cargo of Panama canal scrap which was brought to this port last week by the Chicago House-wrecking Co., totaled 5,400 tons and another shipment of 1,800 tons is afloat. The scrap is unsold and will be stored. It is necessary that it be moved from the Isthmus at this time.

Weak and Dull

New York, Nov. 3.—In the absence of any important demand, scrap prices remain weak in this district and trading is dull. Consumers are making new purchases only in a hand to mouth fashion and these call for small lots. Some orders of moderate size for heavy melting steel are being placed now and then by eastern Pennsylvania steel works, who continue able to buy at practically their own figures. A lot of steel to apply upon one of these recent orders was purchased by a broker this week at $7.25, New York. Carload sales of No. 1 railroad wrought have been made by dealers in this district for eastern Pennsylvania shipment at $11, delivered. Sales of stove plate to middlemen are noted at $7.10, delivered New York. Turnings and borings and wrought pipe are lower.

Sales Light

Buffalo, Nov. 3.—Prices remain the same and general conditions in the market have not improved or declined since last reported. Dealers are looking for a turn for the better to develop shortly. Sales were very light in all lines.

Railroads Flood Market

Chicago, Nov. 3.—Continued and increasing weakness characterize the scrap market in the Chicago district and railroads have before the trade lists aggregating 25,000 tons. Some items have shown sufficient weakness to bring about a reduction in quotations and undoubtedly other items would show equal reductions, were there sufficient transactions to make a price known. The list for the most part is nominal with practically no business moving.

The Baltimore & Ohio is offering 14,000 tons of scrap, which includes 4,000 tons of long steel rails, 1,300 tons of No. 1 wrought and 700 tons of No. 2 wrought; the Chicago & Northwestern offers 6,200 tons, including 1,500 tons of long rails and 600 tons each of No. 1 wrought and iron angle bars; the Great Northern railway's list embraces 4,600 tons, which include 1,120 tons of long steel rails, 200 tons of No. 1 railroad wrought and 400 tons of No. 2 railroad wrought. The C., P. & St. L. list is 700 tons and the Queen & Crescent 400 tons.

Waiting on Railroads

St. Louis, Nov. 2.—The only scrap list out in the St. Louis market is for 300 tons placed by the Vandalia railroad. Prices have not changed since last week, but the feeling is weak, and dealers declare they will hold off until the railroads begin to buy.

Demand for Machine Cast

Cincinnati, Nov. 2.—The only bright spot in the iron and steel market is a slightly better demand for No. 1 machine cast, which is quoted at from $8.50 to $9 per net ton. This has been brought about by orders recently received by local foundries from machine tool builders, who in turn have taken orders for a large number of lathes for shipment to European countries engaged in the present war. Outside of this, the market is very quiet and featureless and prices have not varied in any instance, although they are very uncertain and fluctuate because of the lack of real transactions to form a basis of comparison.

(*For complete prices see page* 888.)

Looking Ahead

Some Inquiry for Furnace Coke for Next Year's Delivery

Pittsburgh, Nov. 3.—Some inquiry for 1915 Connellsville furnace coke has come out the last few days. A few blast furnace managers have submitted sliding scale contracts for shipment through the entire year, and quotations have been asked for the first half of next year. So far as can be ascertained, no sales have been made recently for extended delivery. Spot furnace fuel is offered at $1.60, ovens, and prices range from that figure to $1.75. Foundry grades are quiet, but unchanged in position. The *Connellsville Courier*, for the week ending Oct. 24, says production was 229,519 tons, a decrease of 8,210 tons, compared with the week before. Shipments fell off about 21,000 tons.

Southern Coke Declines

Cincinnati, Nov. 3.—Southern coke prices have slightly declined recently following a long period of inactivity in the market, due to the fact that practically all furnaces and foundries in this territory have closed for requirements until well after the first quarter of next year. Wise county and Pocahontas furnace coke is now quoted at from $1.75 to $2, ovens, Pocahontas foundry and New River furnace grades at from $2 to $2.25, ovens, New River foundry at from $2.50 to $3, ovens, and Wise county foundry at from $2.10 to $2.40, ovens.

Inquiry for Smelter Coke.

St. Louis, Nov. 3—There is an inquiry in the St. Louis market for 12,000 tons of smelter coke. Other grades of coke are stagnant in the St. Louis market, with no good prospects in sight. Connellsville and Virginia best foundry grades are quoted at $2.50, ovens.

Smelting Coke Bought

Chicago, Nov. 3.—(By wire.)—The Omaha Smelting Co. has purchased 12,000 tons of smelting coke from the La-Clede Gas Co., St. Louis.

Reports that the Riverside plant of the National Tube Co., Pittsburgh, at Wheeling, W. Va., will resume operations at an early date are denied. The plant has been idle for some time.

Shapes for Australia

Inquiry Received in East Regarded as a Means of Getting Information in This Country

Philadelphia, Nov. 2.—Eastern shape mills have been asked to quote on some indefinite quantities of beams, angles, channels and other forms for delivery to Australia and it is intimated that on a favorable price a round tonnage might be obtained. This inquiry is regarded chiefly as a desire to obtain information regarding specifications and sizes offered in this country. Mill representatives and fabricators continue to designate the present market as the dullest in their experience which, in the case of one steel maker and fabricator in this territory, covers a period of 30 years. Whether these expressions accurately or not portray the historical character of the present market, it is evident that the new tonnage now coming out is ridiculously small and that the position of the mills and fabricating shops is becoming worse and worse. Small orders still rule and these are fewer. Prices are quotably lower in that 1.25c, Philadelphia, more generally is being quoted to the larger buyers and on the heavier orders. Small lots still bring $1 higher.

Very Quiet Week

New York, Nov. 3.—Some of the largest fabricating interests in eastern territory report that the past week has been about the quietest in their history. One of these is the American Bridge Co., which during the final week in October booked only about 1,000 tons in its eastern division and received new inquiries aggregating not more than that amount. A few structural projects which have been pending for some time in this city are being placed, one of them, involving 3,000 tons, and these usually have been done at the expense of both plain material and fabricating prices. Railroad work is very light and it is to be observed that decisions on some lots of bridge work recently pending in this market, are very slow. Prices on structural material now may be quoted at 1.26 to 1.31c, New York, or from 1.10 to 1.15c, Pittsburgh.

Fabricators Need Tonnage

Pittsburgh, Nov. 3.—Advices from fabricators and erectors in the Greater Pittsburgh district offer no encouragement. Shops are in need of additional tonnage, prices are low, and indications are that work under contemplation will be held up indefinitely. Structural shapes are fairly firm at 1.15c, but plates are quotable at 1.10c. Bids closed today on the new Shenley high school, this city, involving approximately 1,300 tons.

Structural Business Light

Chicago, Nov. 3.—Although a multitude of building projects are ready to go ahead, the financial situation has not come to the point where financing is advisable at present interest rates and lettings of structural material are comparatively few. Structural shapes are obtainable at 1.25c to 1.34c, Chicago, the minimum being for delivery in the city proper. Lettings in the west during the past week aggregate a trifle over 700 tons and consist of three bridges and an institutional building.

CONTRACTS PENDING.

Troop I Armory, Buffalo, 300 tons, C. H. Everett, Buffalo, low bidder on general contract.

Contract 3, New York State Erie-barge canal, 400 tons structural, bids opened Nov. 10 at Albany.

Vocational high school, Syracuse, N. Y., 400 to 500 tons, bids about to be issued.

High school, Rochester, N. Y., 400 tons, plans being prepared.

Bids closed Nov. 3 on new Schenley high school, Pittsburgh, 1,300 tons.

Western high school, Washington, D. C., about 500 tons; bids to be received Nov. 9.

Bins for steel plant of Corrigan, McKinney & Co., Cleveland, 1,000 tons. Bids submitted.

CONTRACTS AWARDED.

New Process Brewing Corporation, Syracuse, N. Y., three additional buildings, 500 tons, awarded to Lackawanna Bridge Co., Buffalo.

Office building at Thirty-fourth street and Broadway, New York City, 300 tons, awarded Bethlehem Steel Co. by the general contractors, the Thompson-Starrett Construction Co.

Colony Club, Sixty-second street, New York, 1,000 tons, awarded Eastern Steel Co.

Drill hall, Cornell University, Ithaca, N. Y., 1,100 tons, steel work awarded Phoenix Bridge Co.

Addition to the plant of the Rumsey Mfg. Co., Seneca Falls, N. Y., awarded concrete.

Section No. 1 of the Park Place, Williams and Clark streets subway extensions, New York City, 2,775 tons, awarded to the American Bridge Co., by the contractors, F. L. Cranford, Inc.

Rockefeller Institute building, New York City, 500 tons. Awarded Post & McCoard and fabrication will be done by American Bridge Co.

Rodgers Sand Co., Pittsburgh, six steel barges, 800 tons, American Bridge Co.

Pennsylvania railroad grade crossings, Wilkinsburg, Pa., about 700 tons, Cambria Steel Co. and McClintic-Marshall Co.

Rusk County, Wis., town line bridge over Chippewa river, Dewey bridge over Flambeau river, 304 tons, to Worden-Allen Co.

Y. M. C. A. building, Canton, O., 400 tons bars, E. I. Landor low on general contract.

San Benito County, Cal., four 140-foot spans over San Benito river on San Juan and Sargent road, 240 tons, to American Bridge Co.

German Old People's Home, East Oakland, Cal., 175 tons, to Ralston Iron Works.

Girders for Panama Canal, 750 tons awarded the McClintic-Marshall Co.

Engine house, Panama canal, 200 tons, awarded the Belmont Iron Works.

Grade crossing work for Pennsylvania railroad, Wilkinsburg, Pa., 850 tons of which 600 tons went to the Cambria Steel Co. and 300 tons to the McClintic-Marshall Co.

Lindner building, Cleveland, 1,300 tons; general contract to the Crowell-Lundoff-Little Co., Cleveland. Steel not yet awarded.

(For complete prices see page 888.)

Ore Shipments

Were Light in October—Pittsburgh Steamship Co.'s Loading Ended

Ore shipments during October were 4,242,392 gross tons as against 6,526,103 gross tons for the corresponding month last year, a decrease of 2,283,711 tons. The movement to Nov. 1 was 30,951,805 tons as against 45,799,520 tons for the corresponding period last year, a decrease of 14,847,715 tons.

Following are the shipments by ports during October and up to Nov. 1, with corresponding data for the preceding year:

Port.	October, 1913.	October, 1914.
Escanaba	617,119	421,341
Marquette	369,293	265,861
Ashland	497,952	487,829
Superior	2,040,651	1,442,216
Duluth	1,689,427	918,144
Two Harbors	1,311,661	707,001
	6,526,103	4,242,392
1914 decrease		2,283,711

Port.	To Nov. 1, 1913.	To Nov. 1, 1914.
Escanaba	4,914,342	3,440,992
Marquette	2,942,897	1,651,579
Ashland	4,056,754	3,229,746
Superior	12,858,975	10,920,469
Duluth	11,520,153	6,197,043
Two Harbors	9,506,399	5,511,976
	45,799,520	30,951,805
1914 decrease		14,847,715

Buys Cuban Ore

New York, Nov. 3.—A Chester, Pa., furnace which has just undertaken the manufacture of low phosphorus pig iron has purchased 30,000 tons of El Cuero, Cuban low phosphorus analyzing in the natural state 61.23 in iron and 0.009 in phosphorus for shipment over a period of months. The first cargo of this block of ore has been delivered. The same furnace also is understood to have purchased a block of Cuban Bessemer ore of about the same tonnage. This transaction represents practically the only break that has occurred in the listless eastern ore market in several months. Cuban ore shipments to the United States by the Spanish American Iron Co. in October were larger than in any recent month due to an increased number of boats offering for cargoes and totaled about 50,000 tons. Another cargo of Chilean ore consigned to the Bethlehem Steel Co. is afloat.

Low American Prices

On Ship Plates Surprise Scotland—English Buyers Satisfied With Quotations on Billets by United States Makers

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Oct. 23.

Business here is generally improving and iron and steel people, at any rate, are amused by the report issued from Germany today that "the British iron and steel industries are at a standstill, and except for the arms and ammunition factories British works are unable to obtain orders."

The government return or national revenue for the week ending Oct. 17 showed receipts amounting to £3,937,508, a net decrease on the corresponding week of last year of £308,053. This is a very moderate decrease for a nation engaged in so gigantic a war.

An interesting return of the pig iron output in Germany for August issued by the Association of Iron and Steelmasters showed an output of 625,927 tons as compared with 1,564,345 tons for the previous month and 1,640,016 tons for August last year. This represents a reduction of about 62 per cent.

Pig Iron

Yesterday's iron market in Birmingham was decidedly more cheerful, and there were many reports of oversea orders and inquiries, but the fall in values has not yet spent itself and pig iron buyers are determined to make the most of "bearing" possibilities to recoup themselves for the large increases they had to pay two months ago.

Hardly any pig iron is being bought. But there are signs of an improving call for foundry pig iron. It is believed that this was for army and navy war material and it is suggested that part of the castings are for shells. The Middlesborough market continues to weaken, yesterday's quotations for warrants being at the low figure of 49s 4d ($11.84). This represents a further decrease on the week. Stocks also continue to increase and now stand at 106,000 tons. Offers from buyers yesterday at Birmingham were 6d (12c) to 1s (24c) below last week's quotations.

Finished Iron and Steel

The steel trade continues nearly everywhere remarkably active. Barrow appears to be the center of activity, owing to the tremendous exertions in the making of warships. Messrs. Vickers alone are employing 20,000 men. Warships and ordinary shipbuilding are taking large supplies of ship plates. The West of Scotland, however, is a little disappointed at its inability to appropriate the whole of the business of ship-steel making, formerly in the hands of the Germans. Continental competition has entirely ceased, but Scotland is staggered at the very low quotations coming from America, and no doubt is entertained in Glasgow that large quantities of American steel will be taken in by the shipbuilders. The steelmakers have been obliged to ease their prices somewhat.

Generally, the steel trade is very satisfactory and makers might be tempted to raise prices but for the marked respect with which they regard American competition; and the recent fall in American prices is regarded as ominous of a descent on the British market. The amount of activity is largely accounted for by the general continuance of building operations, very few of which have been stopped by the war. The railways are not buying much, but there are fair inquiries for rails from India and the Colonies, and it is evident that a large part of the business in railway steel done by Germany is finding its way over here. In Birmingham, steel merchants profess themselves very well satisfied, from recent American quotations for billets and half-finished steel generally, that profitable business can shortly be done.

The iron works in South Staffordshire are still very busy on government orders, and some are behind in deliveries. Outside government requirements, demand is quite moderate. In the galvanized sheet trade, there has been a remarkable slump in prices, chiefly due to the fall in spelter values, which have come down practically to normal prices.

The Engineers' Society of Western Fennsylvania will hold a smoker Friday evening, Nov. 6, for which an interesting program has been prepared. Monday evening, Nov. 9, the bi-monthly meeting of the mechanical section will take place. John D. Berg, vice president Dravo-Doyle Co., Pittsburgh, will read a paper on "Steam Turbine Mill Drive."

Steel Company Band.—John Milliken, chief of the employment bureau of the Portsmouth Steel Co., Portsmouth, O., has organized a band made up entirely of children of the company's employes. Under the careful instructions of the leader, Joseph Hladik, a carpenter in the employ of the company, the band is now playing all of the popular pieces and has given several concerts very successfully.

METAL MARKETS

New York

Nov. 2.

The most interesting of the non-ferrous metals at present is tin, which, as a result of great scarcity in the spot supply here, and the possibility that a new turn in the war situation may interrupt or paralyze shipments, is advancing in price. In London the market today went up to £132, an advance of £1. In New York, the price has been advancing slowly but steadily during the past few days, with the ascension more marked today. Spot is very closely held and bidders at 32c, compared with 31.62½c this morning, are unable to interest sellers.

In copper, the problems of the producers are becoming more serious. For some time past, the British government has been detaining cargoes of American copper bound for such neutral ports as Naples, Rotterdam, Christiana, and Copenhagen, with the result that the department of state at Washington has taken steps to secure immediate action on these cargoes by England. On Saturday the situation was complicated further by the action of England in removing copper from the list of conditional contraband and classifying it as contraband. This means that all copper seized, whose destiny is proved to be Germany or Austria, will be confiscated. The domestic market in electrolytic is quiet, the metal being quoted at 11.37½c to 11.50c, delivered 30 days, by first hands. There has been an active demand the last week for lake, with the result some lake producers are sold up over the remainder of the year. The lake market is firm now but quiet, with the price of good ordinary brands of prime lake nominally 11.50c, cash.

Spelter is quiet, but large curtailment in production, as well as a fairly good demand last week, has served to firm up the market. Prime western brands now are obtainable at 4.90c to 4.95c, St. Louis, or 5.05c to 5.10c, New York.

In lead also the production has been curtailed and, independent producers having made good sales at the low prices, the outside market is higher. The outside market is quotable at 3.37½c, St. Louis. The American Smelting & Refining Co. continues to ask 3.50c, New York, and 3.42½c, St. Louis. The market is quiet.

Antimony was excited last week by reason of large sales abroad, and there was talk of Cookson's at 19c, duty paid, New York. The market now is quiet but firm and importers are willing to do business on the following basis: Cookson's, 18c; Hallett's, 17c; Hungarian, 15c. These prices, however, will be shaded by resellers.

The aluminum market continues quiet. The domestic producer asks 19.50c, Niagara Falls, on 1915 delivery, and has been quoting 19 and 20c, Niagara Falls, on spot. Sellers of foreign are offering spot at 18.50c, duty paid, New York, and some of them are offering to take early part of 1915 contracts at 18.50c, delivery, however, not being guaranteed; as a result these offers do not prove attractive to many buyers.

More Hopeful Feeling

Shown in Some Quarters in Regard to Railroad Buying—Few Tangible Developments

New York, Nov. 3.—A more cheerful sentiment is being shown by a few manufacturers who depend largely upon railroad patronage, but it cannot be said that this is a general feeling, as there is very little of a tangible character upon which to base it. Railroad buying continues to follow extraordinarily small and cautious lines, in all products related to iron and steel. Hope for an early and in most cases for a favorable decision for the railroads in the advanced freight rate case now in the hands of the Interstate Commerce Commission is expressed in the steel trade.

The Norfolk & Western railroad, which has been considering the closing of 25,000 tons of rails for 1915 requirements, has decided to defer action upon this matter until after Jan. 1. Other scattered rail negotiations continue, but these are coming slowly to a head. Makers still are figuring upon the inquiry of 10,000 tons of rails for Russia. It now is understood that the rail asked for is of the 67-pound class. No other important orders now are pending. A lot of 1,000 tons of girder rails practically is closed at New York City and is expected to be furnished by the Lorain Steel Co.

In rolling stock, the Louisville & Nashville has placed 17 additional passenger equipment types with the American Car & Foundry Co., and the Great Northern has asked for 21 cars of this class. The Northern Pacific still is negotiating for 95 and the Southern Pacific for 24 assorted passenger types. Some foreign inquiries for cars are receiving attention. Japan continues to be looked upon as a possible large purchaser, but only small definite inquiries now are before builders. Chile has taken bids on 200 cars of light type and Russia is in the market for both cars and locomotives. A few more locomotives are being placed by domestic lines, but the number is very small. The Big Four has given ten to the American Locomotive Co.

Scrap Market Clogged

Cleveland, Nov. 3.—The last outlet for scrap in this district was closed yesterday when the Lake Erie Iron Co. held up shipments. No consuming mill now will take in any material, so the market is literally clogged with material. Heavy melting steel has taken another slump, now being quoted about $8.50 to $9.25, the maximum being for best grades of shop steel. Although this is the lowest price ever recorded in the scrap market, material is in no demand. Dealers who stocked up during the summer in expectation of a good buying movement in the fall now find themselves with well-filled yards, and they must sell at a sacrifice if they wish to realize any ready money. Mills are doubtful about the outlook, are stocked to capacity or are hindered by the financial stringency; at any rate, they don't seem to be hunting bargains, dealers say.

Cast Pipe

Is Being Bought Very Slowly and Prices Are Weak

New York, Nov. 3.—A requirement of about 1,000 tons of 6, 8, 10 and 12-inch pipe for Riverhead, L. I., has been satisfied and this business is reported to have gone to R. D. Wood & Co. Tonnage for both municipalities and private buyers continues to come out very slowly and the market is in a dull condition. Prices are weak and remain on a low plane, but some makers are less inclined to meet competition, preferring, because of the small margin of profit or loss involved, to further curtail capacity. Some matters for export continue to be raised but there are few developments in this direction. Havana, Cuba, which was figuring on 1,170 tons of pipe and specials has taken no action.

Little Demand at Chicago

Chicago, Nov. 3.—The cast iron pipe market, which has been unusually dull during this fall, has seen no improvement and tonnages going forward are unusually small. The United States Cast Iron Pipe & Foundry Co. took 200 tons at Ashton, Ill., recently, and this is the only tonnage of sufficient importance to attract attention. Duluth will open bids Nov. 6 on 300 tons and Springfield, O., on Nov. 13, for 300 tons. Cast iron pipe foundries are much troubled to keep their pits in operation, as business on certain sizes is slack.

A. J. Haws & Sons, Ltd., Johnstown, Pa., manufacturers of fire brick, have complained to the public service commission of Pennsylvania against proposed switching charges to become effective Nov. 1. The new schedules provide a charge of 20 cents a ton, as against the present rate of $2.50 a car regardless of the weight of contents.

(*For complete prices see page* 888.)

Pipe Prices

Are Reduced—Another Order Received From Texas

Pittsburgh, Nov. 3.—Under date of Nov. 2, the National Tube Co. sent out new cards on standard steel pipe, line pipe and water well casing, providing a reduction of about $2 a ton. In view of the fact that the National company, on Nov. 1, eliminated the extra 2½ per cent preferential discount, the reduction in prices is only $1 a ton. On larger sizes of standard pipe, including 13-inch, 14-inch and 15-inch black, reductions of about $18 a ton were made. Previously prevailing prices on those sizes were nominal, it is stated. Tubing, casing, boiler tubes and wrought iron pipe were not affected. A second order for about 75 miles of 6-inch, 8-inch, 10-inch and 12-inch pipe for shipment to Waco, Tex., for a gas line, has been placed in this district. Whether the order for a similar tonnage, placed two weeks ago by another interest, will be cancelled, is unknown.

Next Place of Meeting

Youngstown members of the American Iron and Steel Institute who attended the recent meeting in Birmingham report that they found a strong sentiment in favor of holding the next meeting of the institute at Youngstown. Action will probably not be taken by the directors of the institute for several months. Joseph G. Butler Jr. and James A. Campbell are among those who have been active in presenting the invitation from Youngstown.

Diesel Engines Ordered

An order for six Diesel engines to be used in United States submarine boats has been placed by the government with the Busch-Sulzer Bros. Diesel Engine Co. at St. Louis. The engines contracted for are of 600-horsepower each, and will be placed in submarines L 5, 6 and 7, now under construction by the Lake Torpedo Boat Co., at Bridgeton, Conn. The St. Louis firm will begin running in several days with a double force. The amount of the present contract exceeds $250,000.

If a babbitted bearing heats pull it to pieces and look for black spots. Those are the places to scrape.

Big Decline in Pig Iron Output

Production in October Was Smallest in 45 Months, While Number of Active Stacks is Lowest in More Than Six Years

The falling off in blast furnace activity that began in January, 1913, resulted in bringing the number of active stacks on the last day of last month to the lowest total since June 30, 1908. The consequent loss in pig iron production brought October's output to the lowest figure in 45 months, or since January, 1911. With one other exception, October's output of pig iron was the smallest since December, 1908.

AVERAGE DAILY PRODUCTION.

	1914.	1913.	1912.
January	60,624	89,929	66,220
February	67,450	92,095	72,372
March	75,534	89,123	77,791
April	75,383	91,812	79,254
May	67,646	90,865	80,753
June	63,486	87,229	81,125
July	63,075	82,525	77,502
August	64,403	81,839	80,650
September	62,757	83,137	81,482
October	57,077	81,933	86,569
November	.....	74,322	87,985
December	.....	63,746	89,590

The production of pig iron last month was 1,769,385 tons, compared with 1,882,718 tons in September, a loss of 113,333 tons. In average daily production the figures for the two months were 57,077 tons and 62,757 tons respectively, a loss during October of 5,680 tons.

The net loss in active stacks last month was 18, three furnaces being relighted and 21 blown out. There were 162 furnaces in blast on Oct. 31. The furnaces which were put in blast were smaller merchant furnaces, while 17 of those that were added to the idle list were large steel works furnaces. Of the furnaces blown out, two-thirds were put out during the last half of the month, so that the full effect of their idleness was not reflected in the October total.

MONTHLY PRODUCTION.

	1914.	1913.	1912.
January	1,879,336	2,787,800	2,052,806
February	1,888,607	2,578,670	2,098,796
March	2,341,551	2,762,823	2,411,529
April	2,261,501	2,754,353	2,377,621
May	2,097,019	2,816,825	2,503,341
June	1,904,566	2,616,883	2,433,737
Total 1st half	12,372,580	16,317,354	13,877,830
July	1,955,324	2,558,275	2,402,567
August	1,996,483	2,537,018	2,500,163
September	1,882,718	2,494,098	2,444,454
October	1,769,385	2,539,924	2,683,645
November	.....	2,229,960	2,639,562
December	.....	1,976,138	2,777,292
Total 2d half	.....	14,335,413	15,447,683
Grand total	19,976,490	30,652,767	29,325,513

The principal loss was shown by the steel works or non-merchant furnaces. Seventeen of these stacks joined the idle column, while none was relighted. Of the loss in output during the month, 110,686 tons was due to the slowing down of the non-merchant furnaces. The production of steel-making iron in October was 1,289,204 tons, compared with 1,399,890 tons in September. In average daily output the figures for the steel works furnaces were 41,587 tons in October and 46,663 tons in September, a loss last month of 5,076 tons.

The total production of merchant iron in October was 460,773 tons, against 468,177 tons in September, a loss of 7,404 tons. The average daily production of the merchant furnaces in October was 14,864 tons, and in September 15,606 tons, a loss of 742 tons. Three merchant furnaces were relighted and four put out of blast in October.

Ferro production in October was 13,593 tons, against 10,985 tons in September, a gain of 2,608 tons. Spiegel production was 5,815 tons in October and 3,666 tons in September, a gain of 2,149 tons.

Changes in Active List

The merchant furnaces relighted were Dunbar No. 1, American Manganese Mfg. Co., Oct. 14; Rockdale, Rockdale Iron Co., Oct. 25, and Belfont, Belfont Iron Works Co., Oct. 6. Those blowing out were Zenith, Zenith Furnace Co., Oct. 4; Mayville "B", Northwestern Iron Co., Oct. 1; Niagara "A", Tonawanda Iron & Steel Co., Oct. 30, and Mary, Ohio Iron & Steel Co., Oct. 23.

The steel works furnaces blown out were South Works "E", Oct. 9, and Joliet No. 4, Oct. 1, Illinois Steel Co.; Gary No. 5, Oct. 25, and Gary No. 9, Oct. 10, Indiana Steel Co.; one Edgar Thomson, Oct. 20, one Duquesne, Oct. 16, one Clairton, Oct. 22, one Isabella, Oct. 22, one New Castle, Oct. 1, one New Castle, Oct. 24, one Ohio, Oct. 19, one Mingo, Oct. 22, and one Mingo, Oct. 27, Carnegie Steel Co.; Monongahela No. 4, National Tube Co., Oct. 3; Mattie, Girard Iron Co., Oct. 27; Haselton No. 3, Republic Iron & Steel Co., Oct. 15, and Youngstown "C", Youngstown Sheet & Tube Co., Oct. 12.

No. 1 furnace of the American Manganese Mfg. Co., at Dunbar, Pa., has been making pig iron, spiegel and ferro-manganese since it was put in blast on Oct. 14. The furnace was run first on foundry iron, running 2 to 3 per cent silicon. Later it was put on 20 per cent spiegel and for a part of the time it has been operating on 30 to 44 per cent ferro-manganese.

The Zenith furnace of the Zenith Furnace Co., Duluth, Minn., will be equipped with a new shell and relined before being put back in blast.

Of the five furnaces which were banked during September, the fires were kept lighted in four of them during October. These were Hannah, Republic Iron & Steel Co.; Clinton, Clinton Iron & Steel Co.; Shenango No. 4, Shenango Furnace Co., and Lynchburg, Oriskany Ore & Iron Corporation. The fifth stack, Haselton No. 1, Republic Iron & Steel Co., was put back in blast on Oct. 27.

OCTOBER PIG IRON.

States.	No. of stacks.	No. in blast last day of month. Oct.	Sept.	Total tonnage made. Merchant.	Non-Merchant.	Totals. Oct.	Sept.
Pennsylvania	157	67	73	104,802	628,632	733,434	778,628
Ohio	73	31	37	88,041	320,964	409,005	431,618
Alabama	45	19	19	111,578	43,902	155,480	150,336
Virginia	22	4	4	15,531	.....	15,531	16,931
New York	26	11	12	61,861	51,738	113,599	111,406
New Jersey	7	1	1	6,860	.....	6,860	8,559
Illinois	26	9	11	22,339	98,462	120,801	151,502
Colorado	6	2	2				
Indiana	10	6	8				
Maryland	4	1	1				
Wisconsin	6	2	3	14,898	138,573	153,471	171,989
Kentucky	7	2	2				
West Virginia	4	1	1				
Tennessee	18	5	4				
Washington	1	0	0	25,337	6,933	32,270	31,752
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	1	0	1				
Michigan	3	1	1				
Missouri	1	0	0	9,526	.....	9,526	15,346
Spiegel—All states						5,815	3,666
Ferro—All states						13,593	10,985
Total	422	162	180	460,773	1,289,204	1,769,385	1,882,718

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

O. R. Jones, chief electrician for the Youngstown Sheet & Tube Co., Youngstown, has resigned.

Henry Dreses, of the Dreses Machine Tool Co., Cincinnati, returned from Europe on the New Amsterdam on Oct. 31.

W. S. Chase, general sales manager of the National Acme Mfg. Co., Cleveland, sailed Oct. 28 on the Adriatic for England.

Edwin H. Haslam, engineer for Mackintosh, Hemphill & Co., Pittsburgh, designers and builders of rolling mill equipment, is visiting relatives in England.

A. L. Andrews, president of the Newport Rolling Mills Co., Newport, Ky., has returned from a cruising and fishing trip of several weeks at Sewall's Point, Fla.

A. H. Baldwin, who recently has been appointed commercial attache of the Department of Commerce and Labor to be stationed at London, sailed for his new post on Nov. 4.

W. M. Pattison, head of the Pattison Supply Co., Cleveland, has been elected president of the City Savings & Loan Co. The company, which is capitalized at $500,000, opened its offices at 11612 Detroit avenue N. W., on Nov. 2.

H. V. Jamison, advertising manager for the American Sheet & Tin Plate Co., Pittsburgh, who is director of exhibits for the United States Steel Corporation at the coming Panama-Pacific International Exposition, has gone to San Francisco to take actual charge of this work.

Dr. David T. Day has recently been transferred from the United States Geological Survey as petroleum technologist to the United States Bureau of Mines, where he will assist W. A. Williams, chief petroleum technologist, in the collection of a general library of petroleum literature. Dr. Day will also assist in a thoroughly organized research into the chemistry of oils which the Bureau is conducting.

H. M. Wallis Jr., secretary and treasurer of the J. I. Case Plow Works, Racine, Wis., has resigned to devote his entire attention to the Wallis Tractor Co., manufacturing Wallis tractors at Cleveland. Mr. Wallis organized the tractor concern about a year and a half ago and holds a large financial interest in it. At the annual meeting of the Case Plow Works, L. N. Burns, general sales manager for several years past, was elected a director and secretary of the company. W. M. LaVenture, traffic and purchasing agent, was elected treasurer. H. M. Wallis Sr. continues as president.

Rukard Hurd, C. E., Ph. D., recently has been elected a member of the American Institute of Mining Engineers. Since he was elected secretary of the tax commission of Minnesota at the time of its organization in 1907, Mr. Hurd has handled 2,000,000,000 tons of iron ore to determine the valuation for taxation purposes. The

RUKARD HURD

preparation of Hurd's iron ore manual started the author in the making of investigations along original lines. This has led to the development of a specialty, that of expert witness, counsel and appraiser, and Mr. Hurd has been called to testify in many suits and hearings and to take part in numerous consultations. He was called as an expert witness by the United States Steel Corporation in the dissolution suit and by independent mine operators before the Interstate Commerce Commission in the railway rate hearing. Mr. Hurd is also a member of the American Iron and Steel Institute and of the University Club of St. Paul.

R. A. Pendergrass, of the McClintic-Marshall Co., Pittsburgh, read a paper on "Construction Details of the Lock Gates of the Panama Canal," Nov. 2, before the structural section of the Engineers' Society of Western Pennsylvania. After giving a brief description of the canal, he told about the arrangement of the lock gates, furnished by the McClintic-Marshall Co.

John D. Berg, vice president Dravo-Doyle Co., Pittsburgh, will read a paper on "Steam Turbine Mill Drive," Nov. 9, before the mechanical section of the Engineers' Society of Western Pennsylvania, in the society rooms, Oliver building, Pittsburgh. "The Magnolia Cut-Off of the Baltimore & Ohio Railroad," will be described at the regular monthly meeting of the society, Nov. 17, by A. W. Thompson, vice president of the Baltimore & Ohio railroad.

Dean Herman Schneider, of the College of Engineering, University of Cincinnati, has been appointed in the advisory capacity to the board of education of New York City, on matters pertaining to vocational education. Dean Schneider's principal work will be to advise on the organization and operation of co-operative and continuation schools. He will spend one week per month in New York and the remainder of his time at the University of Cincinnati. Dean Schneider was originator of the co-operative engineering course now in use at the University of Cincinnati and in other large educational institutions throughout the country.

Henry M. Atwood, pioneer pipe fitting and machinery manufacturer in western Pennsylvania, has resigned as chairman of the board of directors of the Pittsburgh Valve, Foundry & Construction Co., Pittsburgh. He will continue to serve on the board, despite contrary reports. Mr. Atwood was head of the firm of Atwood & McCaffrey, Pittsburgh, which was consolidated with several other companies in 1900 to form the Pittsburgh Valve, Foundry & Construction Co. Mr. Atwood, who is 76 years old, presented his resignation to the board some time ago, explaining that he wished to be relieved of the responsibility attached to the chairmanship because of advancing age.

Benstock & Rosenberg, Buffalo, are now located in their new office, yard and warehouse at Clark street, near William and the N. Y., C. & H. R. railroad. The increased area and modern improvements permit them to take care of iron and other scrap material business on a larger scale.

Valley Rate

On Pig Iron to Cleveland and Pittsburgh Advanced

Pittsburgh, Nov. 3.—Numerous errors in railroad tariffs, providing rate increases on certain commodities in Central Freight Association territory, which went into effect Oct. 26, have caused considerable confusion among buyers and sellers of iron and steel products. The Central Freight Association territory is included within a line extending from Buffalo to Pittsburgh, down the Ohio river and west to the Mississippi river. No pig iron making materials, excepting limestone, are affected by the advances allowed last August by the Interstate Commerce Commission.

New rates on finished steel products were briefly outlined in THE IRON TRADE REVIEW, of Oct. 29. The freight rate on pig iron from the Mahoning and Shenango valleys to both Cleveland and Pittsburgh was advanced from 90 cents to 95 cents a ton; the rate on this commodity from the valleys to Wheeling was advanced from 95 cents to $1 a ton, and not to $1.48 a ton, as published by one tariff; the rate on pig iron from Pittsburgh to Wheeling was advanced from 90 cents to 95 cents a ton.

Pittsburgh consumers of billets and sheet bars rolled in Youngstown must pay a rate of $1.05 from Youngstown, as against the previous rate of $1. The rate on semi-finished products from Youngstown to Wheeling now is $1.10, as against the previous rate of $1.

Numerous typographical errors have been found in the tariffs, and many errors have been made because of changes in foot notes. It will be several weeks before traffic managers are familiar with new rates.

Cincinnati Rate Adjusted

A new pig iron tariff published on Nov. 2 by southern railroads has brought about a uniform reduction of 35 cents per ton on the freight rate on pig iron from Birmingham, Ala., to Cincinnati. In a recent tariff published by these southern railroads following an order from the Interstate Commerce Commission as a result of the Sloss-Sheffield suit before that body, the pig iron rate from Birmingham to Cincinnati was reduced 35 cents per ton only by those railroads specifically mentioned in that suit. This new rate therefore of $2.90 from Birmingham to Cincinnati became effective only in certain parts of Cincinnati, where foundries were located on these specifically mentioned railroads, or where the switching tariffs were specifically designated by the Interstate Commerce Commission. Foundries in such suburbs as Oakley, North Cumminsville, Addyston, etc., therefore, could not take advantage of this reduction and were necessarily seriously handicapped, as they were forced to pay 35 cents per ton more, or $3.25 from Birmingham, for their iron. A strong protest went up immediately which resulted in the issuing of the new tariff, which has eliminated this difficulty and all foundries in and around Cincinnati now take the rate of $2.90 per ton from Birmingham.

Southern Rates

Washington, Nov. 3.—Complainants in the Sloss-Sheffield pig iron rate case are reported to have prepared for filing with the Interstate Commerce Commission this week a supplemental petition to straightening out the existing confusion of rates, as they affect shippers, from Alabama and Tennessee producing districts to points north. It is believed that an early hearing will be accorded and that the complainants will obtain, with comparative ease, the relief they seek.

Shippers are not, of course, taking an active part in the fight between the southern and northern lines over the division of the new rates. It is thought that the railroads will appeal to the commission to settle this difference.

Heroult Furnace In

The United Steel Co., Canton, O., on Oct. 23, took out the first heat of steel from its six-ton Heroult electric furnace. The first heat of steel was a heat of chrome vanadium steel. This heat was successful and the officials of the company are much pleased that the first heat proved to be a commercial product. The furnace was put in operation under the supervision of J. H. Grey, of the United States Steel Corporation. This Heroult furnace is now in daily operation. The United Steel Co. will make a full line of electric furnace steels.

Proposed Tin Smelter

Washington, Nov. 3.—The United States government approves of the plan for the establishment of a tin smelter in this country for the consumption of Bolivian ore. Progress has been halted, temporarily at least, in the proposal for the financing of the deal by the Bolivian government itself, and at present it appears that, if the smelter is established it will be done solely through private interests.

Strike Review

Is Feature of Annual Report of President Welborn

In his annual report, President J. F. Welborn of the Colorado Fuel & Iron Co., gives a concise, graphic account of conditions surrounding the Colorado strike difficulties. The struggle, he says, was a "contest with an outside labor organization known as the United Mine Workers of America, trying to force its regime upon the coal mining industry in this state, on one side, and the operators acting with a large majority of their workmen opposed to an affiliation with that organization, on the other side." He says that even now union men in the neighboring states to the number of 3,000 have been organized, drilled and armed, and are in readiness to move when called upon; that as soon as the federal troops are withdrawn the strikers will attack the state militia and the property of the mining companies. He concludes his statement as follows:

"It is unbelievable that harmony and justice could prevail in a relationship established through the un-American conditions imposed by the labor organization responsible for this conflict. Recognizing our responsibility to the stockholders, to our employes and to the public, for the proper conduct of the affairs of the company, we believe it to be our duty to take a stand with our workmen against the invasion of that labor organization."

The report which is for the year ended June 30, 1914, shows gross earnings from operation of $17,803,025.21, a reduction of $6,512,862.50 compared with the previous year. The reduction in sales of iron and steel was $3,505,497.93, and of fuel, $3,007,364.57. Operating expenses were $16,729,255.25 and net earnings from operations, $1,073,769.96, being a reduction of $2,546,496.38. Of this decrease, $1,325,176.19 occurred in the steel department and was ascribed primarily to the general curtailment of steel business throughout the country. The decrease of $1,221,320.19 in the fuel department was caused mainly by the direct and indirect effects of the long and bitter coal strike, although without the strike there would have been a substantial reduction in these earnings. Income from other sources was $577,477.39, making a total net income of $1,651,247.35. Bond interest, taxes, sinking funds, and other charges against income amounted to $2,557,215.78, resulting in a deficit of $905,968.43.

T. H. Taylor has been appointed receiver for the Cole Motor Co. of Missouri by Judge Dyer of the United States District Court at St. Louis. The appointment followed the filing of an involuntary proceeding in bankruptcy.

Cuyuna Ore

Deposits Estimated to be About Eighty-two Million Tons

At a public hearing before the Minnesota Tax Commission, on Oct. 28, at which some 50 Cuyuna range operators and owners appeared to protest against the assessed values on iron ores as fixed by the Crow Wing county board of equalization, some very interesting facts were developed. It was stated that the mining engineer of the tax commission (the School of Mines, University of Minnesota, through Prof. Edward P. McCarty) had examined some 300 blue prints of about 4,000 exploration drill reports and had measured and calculated 86,400,541 tons of all grades and classes of iron ore. The tonnage is divided as follows:

	Tons.
Dry iron 55 per cent and better..	51,000,000
Dry iron 50 to 55 per cent.....	24,100,541
Manganiferous material	11,300,000
Total tonnage	86,400,541

Of the 51,000,000 tons of merchantable ore there are 25,215,000 tons of standard ore of *natural iron* 50 per cent or better, which should always receive standard prices, and there are 25,784,993 tons of sub-standard ore of lower than natural iron 50 per cent which will always be penalized.

The hearing was continued to Nov. 9 to take up the question of the value of the ore and until that is determined, none can tell the amount of the assessment. This assessment will incorporate the first assessment of iron ore on the Cuyuna range and will be based on the same system as the assessment of the Vermillion and Mesabi ranges. It is the first time in the history of Crow Wing county that the question has come up. Conditions on the Cuyuna, however, are different than on the Mesabi. It is difficult to gage the different bodies of ore, as each must be judged according to its peculiar physical conditions.

One thing is certain, however, Crow Wing county has a source of revenue which never before adequately contributed its quota in taxation.

Estimates of the ore production on the Cuyuna iron range for 1914 vary somewhat, but these figures, unofficial, come very close to the year's production: Rome pit mine 120,000 tons; Thompson pit mine 200,000 tons; Cuyuna Mille Lacs 40,000 tons; Cuyuna-Duluth 40,000 tons; Barrows 20,000 tons; Armour No. 2 mine 275,000 tons; Kennedy mine 225,000 tons; Iron Mountain mine 500 tons, making a total of 920,500 tons.

The Nordberg Mfg. Co., Milwaukee, which announced some time ago it would engage in the manufacture of the Carels Freres Diesel engines, advises that the war situation abroad has interrupted its plans and has interfered with its intention to manufacture these engines as soon as it had expected.

Rail Inquiry

Comes From Abroad—Billets Sold for Export

New York, Nov. 4. (By wire.)—Norwegian State railways inquire of makers in this country for 30,000 tons of standard rails. An independent Birmingham steel maker has sold 5,000 tons or more of semi-finished and finished steel to British Isles. Steel makers in this country are becoming more cautious in quoting for export in view of the sharp advance in war risk insurance. In some cases, outstanding quotations have been withdrawn.

The Phoenix company is low bidder on 2,000 tons for a highway bridge at Portland, Me. Fabricating competition is very active. Domestic business is very poor. Some companies last month shipped only 25 per cent of capacity.

Lower Prices

Expected on the Pacific Coast—Slight Change for Better

Seattle, Wash, Nov. 2.—There has been a slight change for the better in this section, but it is not expected that business will begin to move at anywhere like normal until after the first of the year. The shingle mills are doing very little. In the main, the larger sawmills are running as best they can under the circumstances, but the smaller ones are not active and the foundries, machine shops and allied industries are exceptionally quiet. People are spending no more money than they can possibly help. The first shock of the war is over, however. Finances are being gradually readjusted and much quiet preparation is under way to be ready for the great volume of business that is bound to be developed at no distant day. The fact that the Alaska railroad is sure of construction in the near future and the further fact that the northwest will largely benefit thereby materially brighten the horizon for this section.

Dealers and foundry people were looking for a material reduction in the price of the output of eastern and southern mills when the war in Europe broke, leaving business to a large extent stranded high and dry for the time being. This feeling was largely due to the effect which traffic by way of the Panama canal is expected to have on prices. A very material reduction is expected, although there has been no change on account of the canal to date. Pig iron is quoted here at $22 a ton, a reduction of 50 cents from the price that prevailed during the summer. However, this is due to the general apathy in business.

While many men are out of employment and many plants not running or running at much less than full time, no strikes or lockouts are imminent. The clay, lumber and mining industries marked for organization purposes at the last annual convention of the American Federation of Labor, held in Seattle some months ago, have not as yet been materially affected, although sporadic attempts have been made to organize them.

Objections Don't Count

New York, Nov. 4. (By wire.)—An interesting feature of the Steel Corporation dissolution suit is the fact that objections to testimony made by opposing counsel during the hearings practically will receive no attention by the court except in cases where counsel distinctly called attention to evidence used by the other side despite objections. In respect to the evidence in general, the court will use its own judgment as to admissability.

Obituaries

George Guest, of Philadelphia, manufacturer of iron and steel specialties, plumbers' hardware, etc., died at his home in that city Oct. 31, after a lingering illness, aged 73 years. He established an iron foundry in Philadelphia in 1876.

Adrian H. Lazare, who was western advertising representative of Engineering Magazine, and who lived in Cleveland, was killed Nov. 2 in Cincinnati, when he was caught in an elevator shaft of the Hotel Sinton and dragged from the sixth to the fourth floor. Mr. Lazare was 50 years old. He was one of the original projectors of Industrial Engineering, He was the western advertising representative of The Engineering Magazine, New York City. Formerly he represented Iron Age at Cleveland.

D. J. Nicholas, general manager of the Allegheny Foundry & Machine Co., Glassmere, Pa., was killed Oct. 27 when an automobile in which he was riding collided with a street car in Pittsburgh. He was well known in the foundry trade in western Pennsylvania, northern Ohio and Michigan.

THE ABC OF IRON AND STEEL

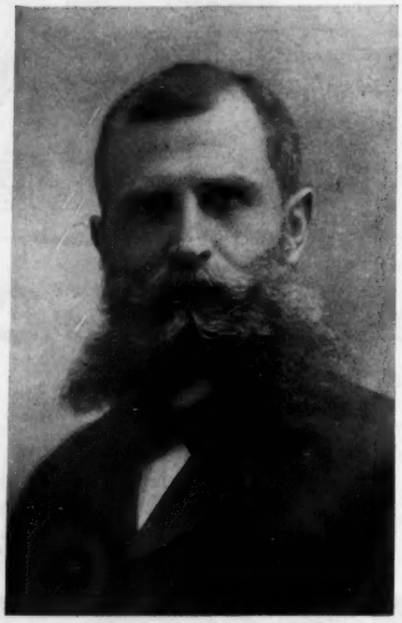
Making Malleable Castings-I

BY DR. RICHARD MOLDENKE

AS EARLY as 1722 Reaumur recorded the making of malleable castings, indicating that this class of work must have been made previous to that time. Since, however, cannon could not well be made by this process, the historians of the latter portions of the middle ages have failed to mention the fact. The profound secrecy thrown about every advance in the iron industry in England and the Continent prevented any definite knowledge of the malleable casting process from reaching this country, and hence Seth Boydon, of Newark, N. J., whose courage in experimenting along scientific lines at a time when a dawning industrial era discouraged this procedure in every way possible, became the early pioneer of the art for America. At this time pig iron was a highly expensive material, and hence the production of a few tons of malleable castings a week was as important as the hundred tons daily of the most modern works of the present. And yet, in spite of the 200 years that have passed, the underlying principles of the process of malleablization of cast iron have not been more than fixed, and this only within the last 25 years. Since about 1895 we know just what the process actually is and within what limits of practice we must confine our operations in order to get the product wanted. There

TWO LARGE AIR FURNACES FOR MELTING MALLEABLE ATTACHED TO A WASTE HEAT BOILER

have been no small number of attempts to shorten the time of annealing the work, to unduly increase the strength, and to produce what might be termed "hybrids", but every time a deviation was attempted from the standard methods, financial failure resulted. The change in process attempted was always based upon some minor characteristic of the white iron casting made in the first stage of the regular process, which characteristic is proved impossible to reproduce day in and day out with sufficient regularity to insure the success of the "short cut" attempted. The maker of malleable castings, as well as he who expects to engage in this business, is warned against all patented and secret processes for making these castings, and to stick closely to the regular process, as described later, carrying this out properly and fully.



DR. RICHARD MOLDENKE

This will bring good results, avoid complaints and retain for the industry many lines of castings now drifting into the steel foundry simply because of the unreliability of much of the product made today. The status of the malleable casting is somewhere between that of the gray iron and the steel casting. It is stronger than the gray iron casting, can be bent and twisted considerably before giving way, and has as its most valuable characteristic a resistance to shock when often repeated not found even in the ordinary steel casting.

On the other hand, the malleable casting is not as strong as the steel casting, and hence in railroad work has been replaced to a great extent by the latter, where a high tensile strength is essential.

To understand the characteristics of the malleable casting for purposes of specifying it at the proper place, it is necessary to describe the process of making the material somewhat fully. The materials used are pig iron, either warm blast charcoal or more usually coke pig going under the name of "Malleable" iron. The scrap consists of the hard sprues and gates from the molding floor, and malleable scrap obtained in the open market. A limited quantity of steel scrap is added as a usual thing to keep the strength up. Occasionally a little ferro-silicon must be added to a bath of metal in case of accident, and when everything is running well, a very limited amount of gray iron scrap can

ANNEALING FURNACES IN MALLEABLE FOUNDRY.—PYROMETER FOR INDICATING TEMPERATURE WITHIN THE FURNACE IS SHOWN AT "P"

be added, but only to take care of accumulations of this material that may eventuate in the shop. It would never be bought as part of the supplies.

The specifications for pig iron are the following: Silicon, definite percentages from 0.75 up to 1.75, depending upon the nature of the work made at the shop. Thus, for the heavier classes, the specifications would call for lots containing 0.75, 1.25 and 1.50 per cent silicon. This does not mean that any shipment running from 0.75 to 1.50 is acceptable, but that when say 1.25 silicon is specified, not less than 1.15 nor more than 1.40 shall be shipped for that order. In the case of lighter classes of castings, the silicon specified would be 1, 1.25, 1.50 and 1.75 per cent with similar allowable variations. Be it understood that mixing iron for malleable purposes is very delicate, and hence a small stock of the very low and very high silicons must be on hand, the bulk being made up of the intermediate silicons. This enables keeping a close control of the mixture, as well as a minimum stock of pig iron in the yard.

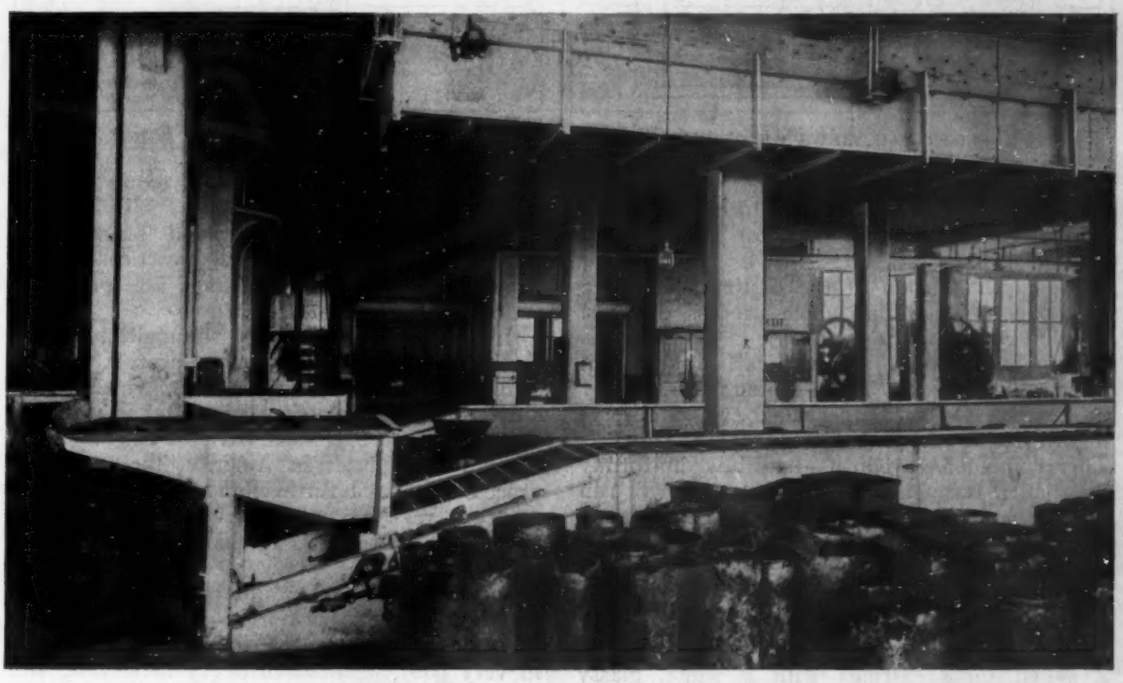
The other elements are specified as follows: Sulphur not over 0.05, phosphorus not over 0.225, though preferably 0.175 should be taken,

SETH BOYDON,
Discoverer of Malleable Iron in the United States

the higher figure being unsatisfactory for the charcoal irons, but not for the coke varieties, where 0.200 should be the maximum allowable. Parenthetically it may be said that charcoal irons are only used where freight conditions allow the prices to run no higher that at most $2 per ton over coke irons. Further, where the practice of a shop is rather poor and uncertain, charcoal irons are used because they stand more oxidation in the melting process than coke irons without serious results. As a general proposition, so far as strength is concerned in the final castings, the value gotten from the comparatively well made charcoal irons can be equalled by the ordinary coke irons with small steel scrap additions—just as is the case in the gray iron foundry. Manganese is specified to be not over 0.60 per cent, and the carbon question is not touched.

Composition of the White Iron

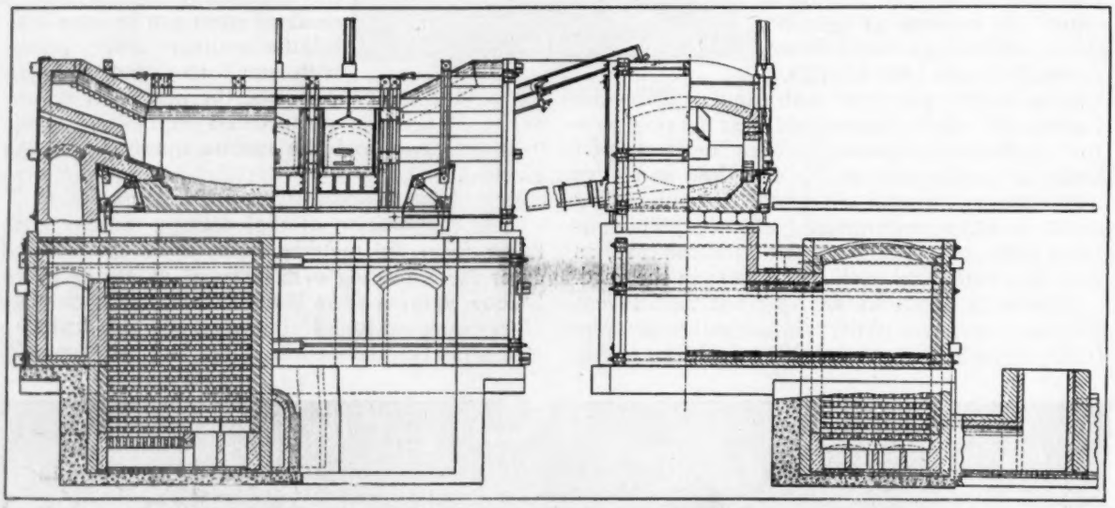
The composition of the castings, as they are taken from the molding floor, and before they enter the annealing ovens, should be as follows: Silicon, varying from 0.45 in the heaviest classes of castings, up to 1.25 in very light pipe fittings and other similar work. The best all around



SORTING TABLES IN LARGE MALLEABLE SHOP

silicon for general castings is 0.65. If foundries would aim for this point they would get excellent material for everything except the very heavy sections now rarely found. Unfortunately, however, the low silicon ranges result in a higher molding loss, the iron being more difficult to control, and hence the tendency is toward higher silicons than should be used, resulting in weaker metal, and oftentimes absolutely unfit castings. The reason for this state of affairs will be given later.

As the melting processes result in an oxidation of silicon and manganese, and a concentration of sulphur and phosphorus, the finished casting will contain besides the silicon above given, below 0.25 per cent manganese, not over 0.225 per cent phosphorus (unless all charcoal irons are used when 0.250 per cent may be safely reached), and not over 0.06 per cent sulphur—which is unfortunately overstepped very frequently, so that sulphur 0.08 per cent is quite common, though this should not be the case for specification castings, for which presumably a higher price is asked than for the ordinary variety.



SECTIONAL VIEWS OF OPEN HEARTH FURNACE FOR MELTING MALLEABLE IRON

As to the carbon of the castings, this is a point upon which the whole process depends. In the original casting, after it is poured, it is absolutely necessary that the carbon be all in the combined form. There should be practically no graphite visible to the naked eye on observing a freshly broken casting for its fracture. This combined carbon is naturally uniformly distributed throughout the casting, and will run from 4 per cent in the case of the older charcoal castings, down to as low as 2.25 per cent in modern practice, though 2.75 per cent should be about the lowest safe point aimed for.

The Annealing Process

When these castings with a white, glassy and extremely hard fracture, are subject to the second process in the making, namely annealing at high temperatures long continued, there are two changes produced. First, there is a removal of carbon from the surface portions of the castings, this being almost the total amount present at the very skin, and down to nothing about a quarter of an inch inward. Hence the carbon range (total carbon) of a malleable casting runs from about 0.20 per cent at the skin to the full 2.75, 3 per cent or more originally present in the interior. It is obvious that under the circumstances, an analysis of the annealed piece for its carbon is worthless. It is only possible to get this information from the hard casting.

The second change produced by the annealing process is the really important one, and is the reason for placing the malleable casting into a separate division of the iron casting industry. This is the change of the combined carbon in the hard casting, to an amorphous graphite called "temper-carbon" in the annealed sample. The white silvery crystalline fracture of the hard casting becomes the black, soft, velvety appearing fracture of the so-called "black-heart" malleable casting of American practice, and of which perhaps a million tons are produced annually in good times.

In the second division of the malleable casting industry, namely the "white-heart" (in contradistinction to the black heart), which is the old Reaumur malleable casting and is made in Continental Europe, some parts of England, and in very few places in America, the annealing process is carried further, and at a higher temperature, resulting in the removal of almost all the carbon present. The change to black-heart is passed, and a silvery steel-like fracture is obtained—of altogether different structure than the original white cast iron. This is naturally only carried out with very thin castings, resulting in very poor metal when heavy in section, and is necessitated in Continental Europe by the fact

that over there the malleable castings are practically all finished by some surface machining, whereas here we would not think of breaking the skin—the best part of the casting in reality.

Melting Process

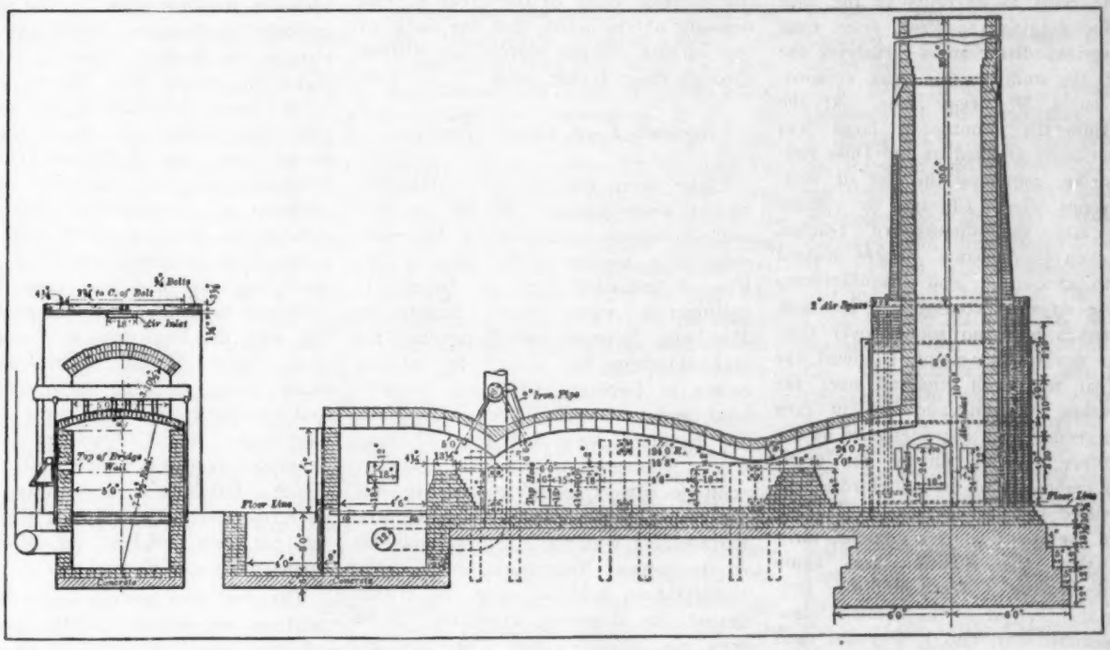
The next thing to discuss is the melting of the mixtures for making malleable castings. Here we have as the process almost universally used, the air-furnace method. Of later years, as an improvement, the open-hearth furnace has begun to replace the air-furnace, as it makes better iron, is cheaper in operation, and requires a higher type of operator, with consequent benefits where the requirements of malleable practice are fully understood. The cupola is also used for making light work and is practically confined to the making of pipe fittings and castings such as require only a little bending ability. In the order of excellence of product the open-hearth would come first, the air furnace next and the cupola last, cupola iron being excluded from specification work. The Bessemer converter is used to a small extent in Europe, as also the crucible process, the latter giving excellent quality of product, but owing to its great expense is on the wane. Finally, the electric furnace may be used for the finest grade of work, but here also the expense will be prohibitive for a long time to come.

After the metal has been melted, whether in the cupola, air furnace or open-hearth, and it is ready to pour, the molds are filled in the usual way, dumped, the sprues knocked off, and the castings sent to the so-called hard-rumbling room, if the work is large enough to justify a separation of the hard from the soft-rumbling work. Here the castings, which are carefully packed to prevent breakage, are rolled clean, and thence go to the sorting room. In the meantime, castings which are too delicate to go through this process, are pickled, or if desired, a majority of the work may be sand-blasted to get a better surface as well as show up defects easier. In fact the modern tendency is toward the use of sand-blast apparatus more and more, as it gives the consumer a greater assurance as to the quality of the castings in regard to surface requirements.

Importance of the Sorting Room

The sorting room, which is the most important department of the malleable foundry, inasmuch as it is the proper point to catch defective work, get the weights and number of castings for given shop orders, and afford an opportunity for foreman and molder to compare notes, is placed between the hard rolling room and the annealing department. From here the classified work is delivered to the packing floor of the annealing room, and the men place the castings in the "annealing boxes", carefully filling the spaces with "scale", which may be an iron ore, puddling slag, or even furnace slag properly granulated. The boxes, three or four high and on iron stools, are then luted up, that is covered with "mud", which is nothing except the molding sand tumbled off in the hard-rolling room that contains clay enough to make a paste when water is added. After luting the boxes are introduced into the annealing oven.

(To be continued.)



SECTIONAL VIEW OF WELL DESIGNED AIR FURNACE

Iron, Steel and Coal in Dixie---II

Second of Two Articles on Iron and Steel Development of the South—This Installment Covers the Interesting Period from 1893 to 1914

BY JAMES BOWRON

IN 1893, the southern situation became greatly aggravated by the national political changes resulting in the transfer of power to the Democratic party, March, 1893, followed by the Wilson-Gorman tariff bill of 1894, which forced reductions of prices upon the industry, owing to the lower duties. To meet these lower prices, reductions of wages were sought, and the Birmingham district was confronted with a four-months' paralyzing strike of coal miners fighting against the reduction from 45 cents to 35 cents as the base price for digging the Pratt seam coal. After serious disturbances, involving the use of the militia, this was compromised on a 37½ cent basis. At the same time the country at large was most seriously affected by the Debs railroad strike, requiring the use of Federal troops from Chicago to restore order, and the disturbance reached down even to Alabama. There seemed little to encourage iron manufacturers in those days to continue in business. The strikes were no sooner over than another era of depression followed the threat of war with England over the Venezuelan question, and this in turn was succeeded by a recrudescence of the free silver question during the presidential campaign of 1896. Hardly was this settled by the election of McKinley and the adoption of a changed tariff policy than the situation was again clouded by the Cuban situation, projecting the shadow of the coming Spanish-American war, and it was not until the close of that war in 1898 that the position clarified.

During this period of financial stringency, increasing the output of pig iron and decreasing the consumption as mills were pushed out of activity, there is little doubt that some producers would have stopped if they could have paid their bills. Heavy tonnages of iron were carried in warrant yards on borrowed money. Pig iron brokers made more money than the producers, either out of their sales commissions or by interest on the money which they advanced to the shippers against their bills of lading, sometimes every week and sometimes every day. Abnormal prices were made, which only covered in some places the cash out of pocket cost. The writer can remember one sale of 5,000 tons of No. 2 foundry at $6.25 spot cash, immediate delivery in one block, to meet a pay roll; another commercial transaction, a cargo of No. 4 foundry for Japan at $5.75, the balance of the sailing ship being filled up with coke. Needless to say such prices provided nothing for the depreciation of the plants which were standing still, or for the replacement of minerals which were being taken from the richest and most accessible points. Only the intrinsic value of the great mineral deposits of the south, and the faith of the various officials carried the district through those trying years.

Beginnings of Export Business

Under these conditions, the familiarity of some engaged in the business with European conditions led to initiation of a foreign trade, shipping pig iron at ballasting rates of freight, in conjunction with cotton, largely to Hamburg, Bremen and Rotterdam for trans-shipment by barges to internal points in Germany and even Switzerland, and to Genoa, Venice and Trieste for northern Italy and part of Austria. Shipments of smaller character went to almost every country importing cotton, the dead weight of the iron harmonizing with the lightness and bulk of the cotton. This trade became most important in bridging over the critical period, the shipments exceeding 100,000 tons per annum. But this was not enough relief. Claims for short weight after transfer to lighters were inevitable. Cars were occasionally left by impatient shipmasters, disputes and delays in settlement ensued, and the business at best was only one of marking time.

It was inevitable under these conditions that the minds of producers of pig iron should turn with anxiety to the question of the production of steel. During the late seventies and early eighties experiments had been carried on in Chattanooga by Mr. Leighton making small amounts of open-hearth steel in an experimental way. These were little more than enlarged laboratory experiments, and ceased with his working capital. The Roane Iron Co., always successful as the owner of the Rockwood furnaces, undertook the manufacture of Bessemer rails at Chattanooga, making the iron from a mixture of Cranberry ore and another found near Morristown, east Tennessee. The latter was irregular in phosphorus, and the deposit limited. As the rails produced were too high in phosphorus, the experiment was discontinued and the mill was ultimately sold and broken up. The experiment was deeply interesting, and conducted with vigor and intelligence.

Before the plant was broken up, however, it afforded opportunity for an adequate demonstration in the way of southern steel-making under the auspices of the Southern Iron Co. In 1890, under the control of N. Baxter Jr., and A. M. Shook, of Nashville, for so many years the leading officials of the Tennessee Coal, Iron & Railroad Co., the Southern Iron Co. undertook the experiment on a commercial scale of the manufacture of open-hearth steel in the south from southern pig iron. In a small way this had been done in Birmingham in 1888 by the Henderson Steel Co. with the large use of fluorspar as flux. About 1,800 tons of steel had been made there, operating in a small way and necessarily at a high cost. For the experiment at Chattanooga by the Southern Iron Co. about 800 tons of South Pittsburgh iron was manufactured under 1 per cent silicon and 0.6 per cent sulphur, the phosphorus approximating 1.40 per cent.

The steel thus made was available for trial on the occasion of the joint visit of the American Institute of Mining Engineers, the British Iron and Steel Institute, and Verein Deutscher Eisenhüttenleute in 1890, at which time a variety of tests of the physical qualities of the steel were made in a most severe and searching manner. It had always been contended that our southern iron contained too much phosphorus for either the Bessemer or the acid open-hearth process, and not enough for basic Bessemer, and that it contained too much silicon to be used successfully in the basic open-hearth furnaces. Mr. Barton is quoted as saying that experiments were made with the concurrence of Mr. Talbot which reduced the silicon in the Ensley pig iron by pouring it through a bath of blast furnace slag, but that whilst this reduced the silicon, it absorbed a fatal amount of sulphur from the slag. The writer was deeply interested in Mr. Talbot's

A paper read at the Birmingham meeting of the American Iron and Steel Institute, Oct. 29, 1914. The author, James Bowron, is president of the Gulf States Steel Co., Birmingham.

process, which was invented and developed at Chattanooga, and became an insistent advocate of a move towards the production of steel by the Tennessee Coal, Iron & Railroad Co., in whose service he was then employed.

In April, 1881, S. G. Thomas, one of the joint inventors of the basic process, had been the guest of the writer at his home in South Pittsburgh, Tenn., and a negotiation was then started for the English company acquiring the sole right to manufacture steel under that process in the south. This negotiation lapsed owing to the lamented death at an early age of the distinguished inventor. At a later date the Tennessee Coal, Iron & Railroad Co. became the owner of Jacob Reese's patent for the duplex process, but the information obtained seemed to indicate so great a loss by oxidation and slagging in the double process as to make it undesirable.

No one in the south had the necessary money to go into such a plant. It was necessary to enlist Eastern capital. At a dinner in Birmingham, Andrew Carnegie had said to President Baxter that the Tennessee Coal, Iron & Railroad Co. owed it to the district to make steel here, but the Tennessee company had all it could do in those trying days to keep hot the irons which were in the fire without burning any of them. Matters, therefore, rocked along until after the development of large beds of dolomitic limestone in East Birmingham. G. R. McCormack said to his colleagues in the Tennessee Coal, Iron & Railroad Co. that he felt sure a liquid slag could be carried on a burden heavy enough to hold the silicon below 1 per cent. After making a few tests at the Alice Furnace, casting in sand, commencing July 22, 1895, the furnace was equipped with chills, and regular commercial practice commenced August 15. In a very short time the entire make of the furnace was being sold to the Carnegie Steel Co., Illinois Steel Co., and other well known companies in the north, under a guarantee that the silicon and phosphorus should run below 1 per cent.

This continued for over two years, by which time the most skeptical were satisfied that suitable iron could be made locally for conversion into steel. The next question arose as to the size and scale of the plant necessary to handle such iron commercially. In 1896 a subscription had been raised among the citizens, Birmingham contributing approximately $75,000 towards construction of an open-hearth furnace at the Birmingham Rolling Mill. On July 24, 1897, the first casting was made at that plant, bottom-poured ingots weighing about 1,400 pounds each. The experiment was too small to be a commercial success, and the company failed in 1899.

In December, 1897, President M. H. Smith, of the Louisville & Nashville Railroad Co., came to Birmingham and told the officers of the Tennessee Coal, Iron & Railroad Co. that his company had invested many millions in and around Birmingham, that the iron manufacturing plants were wearing themselves out, exhausting their most accessible materials, and making no money, and that unless steel was manufactured on a large scale, the district would be a failure. He said that the Louisville & Nashville had too much invested to sit still and watch that failure; that the Tennessee Coal, Iron & Railroad Co. owed it to itself and to the district to go into the manufacture, and that if it refused to do so, the Louisville & Nashville would contribute towards the enlargement of the plant at the Birmingham Rolling Mill. An earnest effort was then made by President Baxter and Vice President Shook to obtain the concurrence of the directors in New York in such a departure, but the menace of the then impending Spanish-American war was such that they refused to consider it. They passed a resolution authorizing the officers to subscribe $100,000 towards the enlargement of the Birmingham Rolling Mill plant, payable in coal and iron over a year, and to contract to stay out of the steel business for a period of years.

Building the Ensley Plant

The writer of this article challenged the wisdom of this action by letters. As a result of this earnest remonstrance the necessary authority was obtained, and after six months' active cooperative effort on the part of the various officials of the Tennessee Coal, Iron & Railroad Co., $950,000 was raised in New York and $150,000 in Birmingham, and an open-hearth plant was located at Ensley upon the plans of The Wellman-Seaver-Morgan Co., of Cleveland, who had been designated by President Smith, of the Louisville & Nashville Railroad Co., for that purpose. This plant was built under the name and charter of The Alabama Steel & Shipbuilding Co., common stock being owned exclusively by the Tennessee Coal, Iron & Railroad Co. Ten tilting open-hearth furnaces, theoretically averaging 50 tons per heat and two heats per day, with a 42-inch blooming mill.

The average production in the first year of operation did not exceed 300 tons per day. The pig and scrap process was employed. The company was not equipped to manufacture anything but billets 4 x 4 inches square and upwards, and it was soon apparent that the problem of finding a market had changed its character, but was still in existence.

Some billets were sold in England, but the principal delivery was to the Alabama Steel & Wire Co., which built a plant abutting upon the Ensley steel works. This was constructed by Chicago and Joliet capital, under the management of E. T. and G. H. Schuler, of Chicago, and C. E. Robinson, of Joliet. Accustomed to Bessemer steel, the results obtained from the open-hearth product were not satisfactory, and in 1903 the company built a plant at Gadsden to supply its own steel, the plant embracing a blast furnace, four 50-ton stationary open-hearth furnaces, and a 36-inch blooming mill. This removed from the Tennessee Coal, Iron & Railroad Co. the largest consumer of its billets, and forced the completion of finishing mills into which the product might be turned.

In 1906 John A. Topping became chairman of the Tennessee Coal, Iron & Railroad Co., being also president of the Republic Iron & Steel Co., and during the ensuing two years considerable enlargement of the steel works was undertaken with the assistance of Mr. F. H. Crockard, who became vice-president and general manager of the Tennessee Coal, Iron & Railroad Co. and district manager of the Republic Iron & Steel Co. The enlargement of the plant and the reconstruction on a stronger and heavier scale was undertaken upon the basis of using the duplex process instead of purchasing scrap in the open market. The amount of money required for reconstruction of the steel works and subsidiary plants was very great, and precluded the possibility of the payment of dividends upon the stock. This stock was, therefore, held by a syndicate.

Miss Armes states that the 16 men whose names are given held more than one-half the entire capital stock, and that about $7,000,000 being expended during the two years, a large amount of this was borrowed through the firm of Moore & Schley, which borrowings in the autumn of 1907 amounted to millions of dollars. A large amount of this was with the Trust Company of America, which also held and controlled among its pledged assets the control of Central Railroad of Georgia. At the height of the panic of October, 1907, when Moore & Schley were called upon to take up the Tennessee Coal, Iron & Railroad Co. stock, it could not be done, and the credit of that great firm, as also of the Trust Company of America, was apparently endangered. On Nov. 5, 1907, as a result of sugges-

tions made at a conference held by leading financiers at the house of J. P. Morgan, two transactions were carried into effect, the sale of the controlling interest in the Tennessee Coal, Iron & Railroad Co. to the United States Steel Corporation, and the sale of the controlling interest in the Central Railroad of Georgia to E. H. Harriman and associates, controlling the Illinois Central Railroad, and making the two an air line from Chicago to the south Atlantic. The simultaneous accomplishment of these two transactions released unavailable assets, and gave both quick assets, money and credit to the concerns that were threatened. The runs stopped, public excitement subsided, and the great panic of 1907 was at an end.

The United States Steel Corporation had thus for the first time become interested in the south, and it is only necessary to refer to the minutes of the Birmingham Chamber of Commerce to see the cordial approbation of the south. The advent of the Steel Corporation was hailed with delight by all who were unprejudiced; and, speaking as one who has never owned a single share of its stock, the writer feels that it has been continuously the greatest single source of benefit that has ever come to the manufacturing south, whether considered from the standpoint of the magnitude of its importance or the breadth and liberality of its policy.

The Atlanta Steel Co.

During this time, however, in the neighboring state of Georgia they had not been standing still. In 1900 the Atlanta Steel Co., under Geo. W. Conners, was organized to make hoops and cotton ties, and started with one 8-inch mill, buying billets. In 1902 a light rolling mill was added for re-rolling. In 1905 two 35-ton open-hearth furnaces were added, a blooming mill, rod and wire mills to take over the surplus steel. In 1906 the company entered the production of spikes, and in 1908 that of woven fence. It produced also wire nails and barbed wire. This plant possessed no raw material of its own, buying both pig iron, scrap and coal. Under aggressive and enlightened management it has kept pace with scientific development, utilizing its exhaust steam by low pressure turbine, and under the presidency of T. K. Glenn maintains good standing in the competitive field.

In 1908 Geo. W. Connors withdrew from the Atlanta Steel Co. and took the old tube mill at Helena, Ala., changing it into a hoop and cotton tie mill, having one 9-inch train with a capacity of 15,000 tons annually, under the title of The Connors-Weyman Steel Co. They purchase their billets, but they mine their own coal.

The panic of 1907 brought down the enterprise at Gadsden of the Southern Steel Co., which had encumbered itself with the purchase of various properties, widely scattered, handicapped by inter-plant freights, and with brown ore deposits pockety in character, seriously affected by the intrusion of sulphur, and largely worked out, whilst the red ore deposits were squeezing down in thickness, becoming interfoliated with slate. After two years the enterprise was reorganized with the assistance of English and Dutch capital, and under new management, which provided additional money, removed the rod and nail mill machinery from Ensley to Gadsden, and built an extremely fine and well-designed wire drawing and finishing plant in connection therewith, and a combination Morgan roughing train and Garrett looping rod mill of 500 tons daily capacity. Unfortunately, no part of the money subscribed was expended in acquiring more reliable bodies of raw material, and the capitalization was entirely beyond the productive capacity of the plant, handicapped as described. In 1912 they passed into the hands of the writer as receiver and trustee, and a new company was formed among the creditors and stockholders of the old one for the purchase of such of the assets as was deemed expedient. This company, under the name of the Gulf States Steel Co., is operating at a profit, free from bonded debt, and has an ingot capacity of 600 tons per day, making 18 x 20-inch ingots of 6,000 pounds weight. It produces plain and galvanized wire, barbed and woven wire fence, nails, merchant bars, and is arranging for the production of tie plates. It has also corrected the deficiency of its predecessor by the purchase of 1,604 acres of Red Mountain ore, near Oxmoor, proved by the drill 19 feet 3 inches thick, over 38 per cent metallic iron, and self-fluxing. This is being developed by a slope 9 feet 6 inches x 17 feet at a pitch of 50½ degrees which will intersect the ore at a lineal depth of 2,482 feet, and at the time of this writing is about 1,260 feet deep. No water has been encountered in driving this slope below 384 feet level, where the direct cementation process was applied and the water stopped with a minimum of trouble and expense. The plans contemplate an output of 2,000 tons per day from this operation.

Since the advent of the United States Steel Corporation into the district, the development of the Tennessee Coal, Iron & Railroad Co. has been continuous under the management of President Crawford, Vice President Crockard, and H. C. Ryding, assistant vice president. The Tennessee company's Ensley plant of today embraces six modern furnaces, 90 feet high, from 21 to 23-foot bosh, two of which have a 12-inch lining with external vertical water cooling, the average production of basic iron varying from 350 to 400 tons from Red Mountain ore. Four furnaces, of which two are rebuilt at Alice and Oxmoor, vary between basic and foundry. Four furnaces at Bessemer are restricted to foundry iron, and one is held for ferro-manganese, or special purposes. The company's operations at Ensley embrace under the duplex process eight 100-ton tilting open-hearth furnaces supplied by two mixers, 250 and 600-ton capacity, and two 20-ton Bessemer converters with total ingot capacity of 75,000 tons per month. Ingots 24 x 24 inches are reduced at the blooming mill to 8 x 8 inches, or slabs up to 24 inches wide. These are reduced to 4 x 4-inch billets for the company's merchant mill at Bessemer, or for the American Steel & Wire Co.'s plant at Fairfield, or for the open market, or are delivered to the rail mill. The finished product of the rail and finishing mill is about 45,000 tons of rails, and at Bessemer 6,000 tons of plates, angles and merchant bars.

The American Steel & Wire Co. has at Fairfield a new plant, embodying 24 acres under roof, containing a rod mill driven by electric motors, with wire department equipped for the production of plain and galvanized wire, nails, barbed and woven fence wire, etc. This plant runs entirely on steel furnished by the Tennessee company, which also furnishes the motive power.

The Southern Ore Supply

It is impossible to pass away from the iron and steel of the south without a reference to the ore supply. It was supposed for many years that as mining operations were pushed down the pitch of the Red Mountain vein, the ore would, as it did near South Pittsburgh, Tenn., run into the original gangue and become lean. This view was held even so late as 1910, when Bulletin No. 400 of the U. S. Geological Survey was published. Mr. Burchard's estimate gives 796,896,800 long tons of red ore in the Birmingham district available for recovery and of commercial value. This is excluding seams too thin to be worked, and too low in metallic iron. The drilling which has since been done by the Woodward Iron Co., the Tennessee Coal, Iron & Railroad Co., and the Gulf States Steel Co. has developed much additional territory which Mr. Burchard's conservative estimate did not include, although on his own figures, he asserts reserve sufficient for 100

years on the present requirements of the district. The opinion of the writer is that, as the ore is both becoming thicker and slightly richer as it flattens out into the basin, Mr. Burchard's estimate of the resources of the district will need to be revised upward.

During the past 16 years there have been constructed at Ensley 240 Semet-Solvay by-product coke ovens, of which 120 were contracted for by the officials of the Tennessee company in 1898, who had, despite the war clouds, sufficient confidence and interest in the process, this plant being the first in the south, and one of the earliest in the United States. Sixty of the same type at Holt, Ala., for the Central Iron & Coal Co., whilst within the past four years there have also been constructed 280 Koppers by-product ovens at Fairfield and 170 by the Woodward Iron Co. at Woodward, Ala. The gas from these ovens is used at Ensley in the raising of steam and calcination of lime and dolomite, and most important of all, is now being used with much success in the direct operation of the open hearth furnaces. At the foundry at Holt, where soil pipe is produced on a large scale, gas has been used for raising steam, melting iron, drying moulds, and at one time for nodulizing. Sulphate of ammonia and benzol are also produced at Ensley and at Holt, and a benzol plant is building at Woodward. The large development of the cast iron pipe industry in the district has afforded an improved market for the tar; this is still further needed in the improved method of road preparation under modern practice.

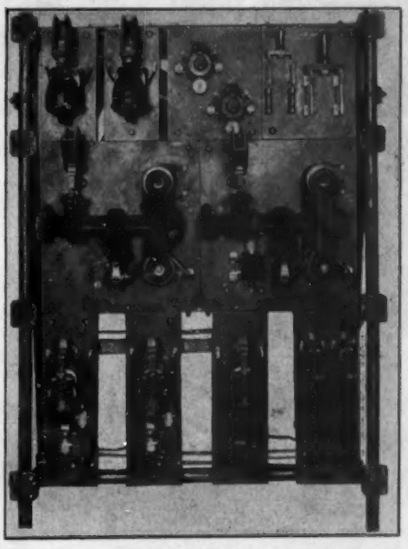
Using By-Products

Exhaust steam collected at Ensley is utilized by four 3,000-kilowatt low pressure turbo-generators furnishing power, not only for the entire plant of the American Steel & Wire Co., but also for the operation of the Tidewater street railroad. And at the Atlanta Steel Co.'s plant the exhaust steam is similarly utilized for running the low pressure turbine at the blooming mill, and at Woodward by-product oven gas is carried to the boilers supplying turbo-generators providing current for the company's ore and coal mines.

Various experiments have been made from time to time in the utilization of blast furnace slag, either for ballast, for mineral wool, or for cement. A more interesting development is the production today from open hearth slag of phosphatic fertilizer, 80 per cent of which will pass through 100 meshes to the inch. The casting machine was a product of the south, to the credit of Mr. Uehling, whilst employed by the Sloss company, and whose patent was purchased by the Carnegie company. At a later date the Tennessee company installed a casting machine of the Jones & Laughlin type.

Arrangements have been made for the introduction of hydro-electric power and the installations are now proceeding by which a large capacity generated by the Alabama Power Co. on the Coosa river, will be within a few weeks delivered to the steel works at Gadsden, mines on Red Mountain, and to the mining operations of the Alabama Co. at Attalla.

The southern manufacturers of iron and steel realize that their advantages are very large deposits of self-fluxing ore and coking coal in close proximity; a fairly abundant supply of colored labor, docile and responsive to kindly treatment, but not of the highest efficiency; a balmy climate free



WESTINGHOUSE CRANE CONTROLLER

from extremes, permitting outdoor work the year round, without danger from freezing weather; and with some prospect of navigation in the near future by barges to tidewater. Against these advantages must be set the distance from densely populated states involving a sacrifice of profits by the necessary freight rates to reach the markets of the world; these markets, however, are put nearer to the south by the opening of the Panama canal. The possibilities incidental to the barging of heavy material from the Birmingham district to Mobile at lower cost than present railroad rates, with the possible upbuilding of Mobile bay by ship yards, graving docks, coaling stations and works for the construction and repair of marine engines, inspire the manufacturers of the south, drawing lessons from the past, to go forward facing the future with patience and with courage.

Crane Controller

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has recently put on the market a new line of magnet switch controllers. Dynamic braking is very desirable for hoist operation because it gives the operator complete control over the load. He can hoist or lower at high speed and stop instantly with no overrun, and he can "inch" the load with precision

Overload protection is provided for by means of two overload relays, one in each side of the line. After the relays have operated, they are automatically reset by bringing the master switch to the "off" position. Since these relays open both sides of the line, failure of operation due to grounded wires is made impossible.

The no-voltage release opens the control circuit on failures of the supply voltage and the motor cannot be started again until the master switch is returned to the "off" position.

In order to secure safety during inspection and repair of crane apparatus, a device for locking the main line switch is employed. The switch is locked open when the safety key is removed and cannot be closed until the latter is replaced. Several holes are provided for padlocks, which may be inserted by men working independently on the apparatus and they prevent the insertion of the safety key as long as they remain in place.

Lackawanna Hand Book

The 1915 edition of the hand book of the Lackawanna Steel Co., Buffalo, has been issued. It is a handsome volume, bound in flexible black leather covers with gilt edges and contains over 450 pages. Nearly a quarter of the book is given over to sections of rails, bars, sheets, beams, sheet piling and other shapes, with tables for the different weights and sections. The book also contains a large number of manufacturers' standard specifications for forging billets, concrete reinforcing bars, structural steel, plates, merchant bars, etc. These specifications include the revisions for the year 1914. Nearly two-thirds of the book is given over to an unusually complete presentation of the properties of structural steel. A large number of engineering tables also are presented. It is being sold for $2 per copy.

Lubrication of grinding machines requires the proper kind of lubricant; this varies according to the kind of work being done and the speed at which the wheel spindle runs.

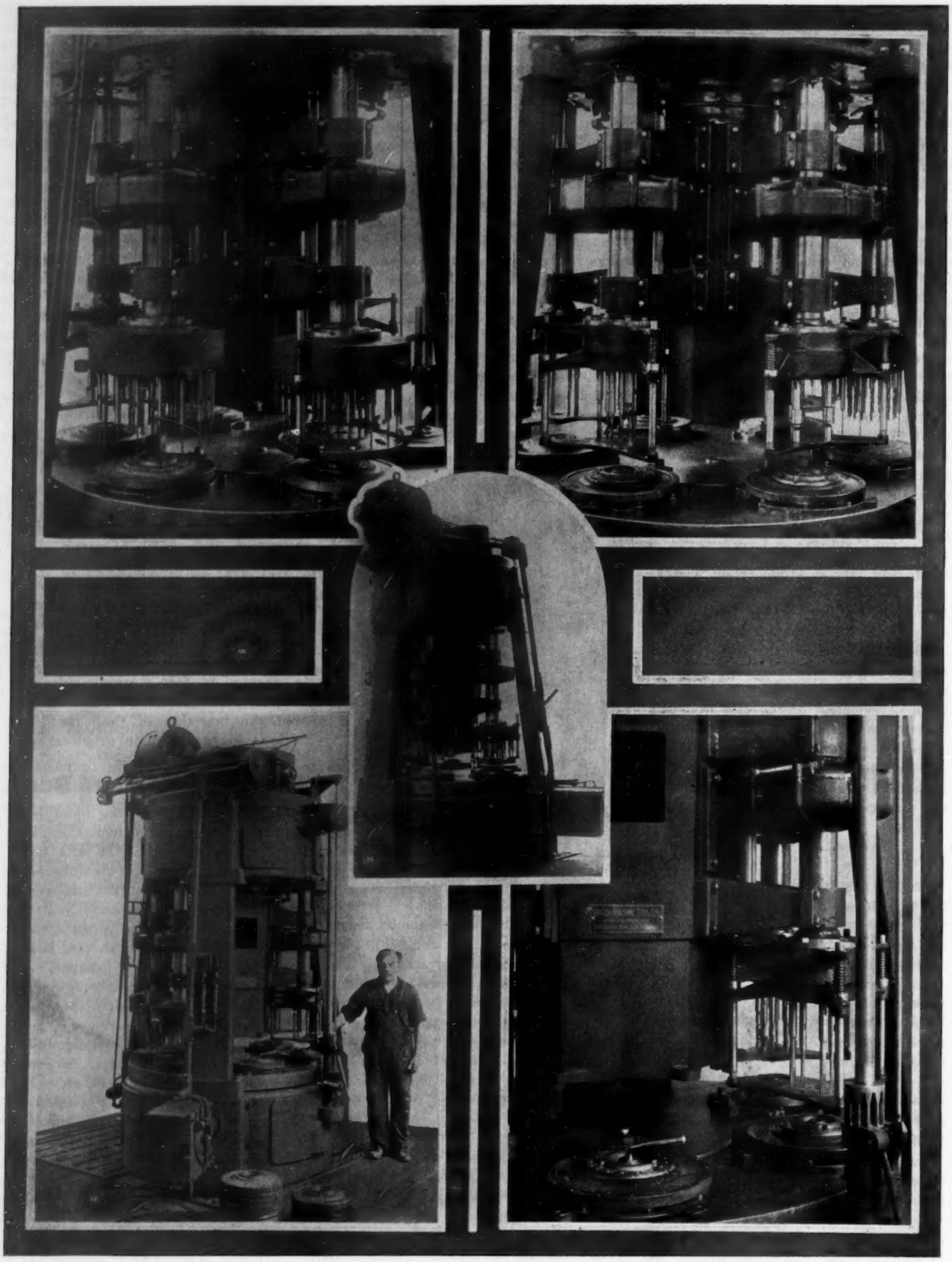


FIG. 1—CLOSE VIEW OF HEAD, DRILLING AND COUNTERBORING OUTER PORTION OF FLYWHEEL

FIG. 2—DRILLS AND JIGS USED TO DRILL HOLES NEAR CENTER OF FLYWHEEL

FIG. 3—REAR VIEW OF SPECIAL DRILLING MACHINE FOR FORD MOTOR CO.

FIG. 4—FRONT VIEW OF SPECIAL DRILLING MACHINE

FIG. 5—REAMING AND DRILLING NEAR CENTER OF FLYWHEEL

Machine for Drilling Fly Wheels

Description of an Interesting Tool Installed by Ford Motor Co. Which Performs Eighty-one Drilling Operations in Fifty-four Seconds

AN example of the great progress which has been made in the United States in the construction of automatic machine tools is found in a multiple drilling, reaming, and counter-boring machine recently built by the Baush Machine Tool Co., Springfield, Mass., for the Ford Motor Co., Detroit. The machine was built for drilling Ford flywheels on which there are 81 drilling operations. With the aid of the machine, this work is accomplished in 54 seconds. The operations occur in the following order:

First—Drilling 16 holes in the inner circle of the flywheel through about 1⅛ inches of metal and 16 holes on the outer circle half way through the same distance.

Second—Counterboring the inside 16 holes and drilling the outside holes through with a smaller drill, resulting in 32 counterbored holes.

Third—Milling or counterboring three half-round faces in the hub of the wheel.

Fourth—Drilling nine holes in the center of the wheel.

Fifth—Reaming five holes.

As will be seen from the illustration, on the opposite page, close centers are of no objection, for the reason that holes can be split up among various heads. Also heavy and light drills can be used in groups, each of the tools being operated at the proper speed and feed. Each cluster of drills is provided with its own jig.

Details of Operation

The flywheel is placed on a supporting block and is secured by means of an expanding center. The counterbore is used to locate the wheel under the jig; the taper leader enters the counterbore as the jigs come down to their working position. In addition to the counterbore, there is a flat dowel in the supporting block which registers between jaws on the extreme outside portion of the jig, thus securing the wheel against rotation.

The feed is actuated by means of a barrel cam which is provided with suitable straps, giving the proper quick approach, feed and return. By means of these cams, the requisite individual speed or travel can be obtained for the various tools.

The table is rotated by a Geneva stop, the mechanism for which lifts the table and carries the weight on a center pintle which in turn rides on a ball bearing. The table also is provided with a hardened steel locking bolt which is cam actuated and comes into play just before the table is lowered to its working position. In the working position, the table rests on a rail slightly smaller than its outside diameter.

Each head is counterweighted and with the exception of the spindle cluster is of the standard Baush construction. The clusters may be readily removed and replaced. In the feeding position, the operator has the switch controlling the starter motor on his left hand and a small lever which instantly stops all feed mechanism including the indexing of the table at his right hand. The machine is driven by a direct connected 25-horsepower Westinghouse motor mounted on the head. The motor drives through gearing. The general construction of the machine is massive, the total weight being 20,000 pounds.

Some Experiments On Oxygen Cutting

BY J F SPRINGER

IN connection with cutting iron and steel with an oxygen jet, the question arises whether any considerable advantage would result from preheating the gas. In those types of cutting torches in which the cutting oxygen is surrounded by an oxy-acetylene flame, a certain amount of preheating does take place. One should expect that such cutting torches would show a high degree of efficiency and certain experiments carried out with the oxy-hydrogen cutting torch having separate jets and the oxy-acetylene cutting torch with a centrally arranged oxygen jet seem to justify this expectation. The steel experimented upon was an open-hearth plate having a thickness of 1.18 inches. It was found that the former type of torch required 50 per cent more oxygen than the latter in burning out equal volumes of material from the cut. This difference is too great to assume that the whole of it is due to any difference in effectiveness of the oxy-hydrogen and oxy-acetylene systems. It must be in part assigned, so it would seem, to the difference in the arrangement of the jet of cutting oxygen.

While the foregoing evidence is mainly suggestive, and by no means to be regarded as conclusive, it does prepare the mind for the results of other experiments where all the tests were carried out under the same system. Two comparative sets of experiments were tried, the type of torch in both cases being an oxy-acetylene instrument having a centrally arranged cutting jet. Whatever advantage may lie in the pre-heating of the cutting oxygen due to this arrangement is common to all the experiments. For the present, therefore, this is not to be regarded as pre-heating at all. In both sets of experiments, cuts were made where the cutting oxygen was specially pre-heated and others where it was left alone.

In the first comparative set, we have seven cuts without and eight with pre-heating. The material was open-hearth steel plate 1.18 inches thick. The aceylene consumption was 8½ cubic feet per hour. The purity of the oxygen was 96.5 per cent; the pressure, about 29½ pounds per square inch. The results, with the oxygen not pre-heated, were as follows:

Length of cut in inches.	Time in seconds.	Time in minutes for 1 linear foot.
25.0	220	1.76
25.0	220	1.76
22.0	195	1.77
22.0	190	1.73
22.5	188	1.67
20.5	175	1.71
17.0	155	1.82
Average.....		1.75

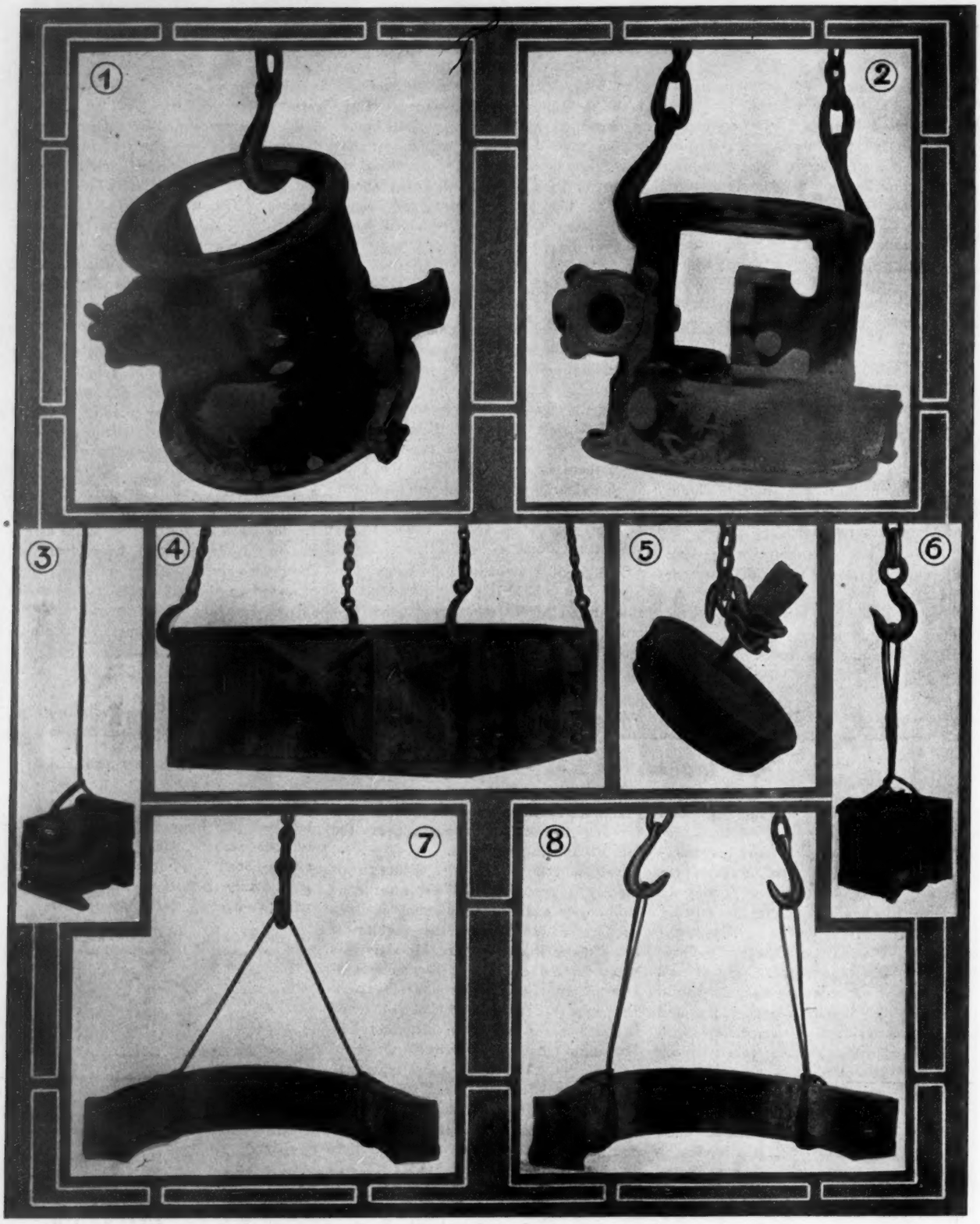
With the oxygen pre-heated, the following results were obtained:

Length of cut in inches.	Time in seconds.	Time in minutes for 1 linear foot.
19.5	140	1.44
18.5	137	1.48
17.5	125	1.43
26.5	180	1.36
18.5	135	1.46
17.5	126	1.44
16.5	120	1.45
22.5	153	1.36
Average.....		1.43

We have here a saving of 0.32 minutes per foot by pre-heating—or 18

(*Continued on page* 888b.)

Care and Safety in Hoisting



Figs. 1 and 2 above show the wrong way and right way to hoist a casting with chain hooks; in Fig. 1 all the load is concentrated on one weak section of the casting, while in Fig. 2 the load strain is properly divided. Figs. 3 and 6 show how small, heavy pieces should be handled in a rope sling. The single rope in Fig. 3 is apt to uncoil and loosen the splices; also the sharp corners may cut the wires. In Fig. 6, the same sling is used properly and bagging is provided to prevent injury at the corners. When a flask is hoisted in the manner shown in Fig. 4, the hooks are badly strained and also are apt to jar off and drop the load. Steel eye rings should be permanently attached to the sides of flasks for the entrance of hooks. Fig. 5 shows a dangerous method of hoisting iron castings. Figs. 7 and 8 show incorrect and correct ways to hoist long castings with rope slings. In Fig. 7 the abrupt bite injures and may break the sling.

For the photographs from which the illustrations on this page were made, we are indebted to the National Founders Association.

Electric Brass Melting Furnace

Description of a New Type of Furnace for Non-Ferrous Metals Designed to Utilize the Pinch Effect

BY G H CLAMER AND CARL HERING

THE purpose of this paper is to describe some recent researches and developments in the field of commercial brass melting, with a special type of furnace.

In the particular type of furnace used in these researches the heat is set free as such in a small portion of the liquid metal in some heating holes at the bottom of the hearth, and then by means of a pressure produced by a recently discovered and peculiar electromagnetic force known as the "pinch effect," this heated metal is "squirted" with a considerable force into the main bath, whereby its heat is carried very quickly as hot metal into the bath and is there distributed, and whereby the metal is at the same time very thoroughly stirred, making it uniform. The cold metal is melted by immersion in this hot bath, like in all covered crucible melting. Cold metal when immersed in superheated liquid metal and wetted by it, takes up heat remarkably rapidly, and anything that increases the speed of melting lowers the standby losses; hence poking the cold metal down into the hot bath is an advantage. This "pinch pressure" operates like a valveless pump, forcibly expelling the freshly heated metal from the heating holes or channels, called resistors, and sucking in the cooler liquid metal from the bath.

This peculiar and heretofore unknown electromagnetic force, which is of considerable magnitude, was noticed by one of the authors some years ago, in a resistance steel furnace with open channels, and proved to be fatal to that furnace, as it kept breaking or pinching off the column of liquid, by crushing it; it is the first mechanical force internal to a conductor, known to the electric art, all the other forces being external. In the present type this force was then applied to circumferentially closed channels of liquid metal submerged beneath the bath, so that rupture could no longer take place; the force tending to crush the conducting column of liquid metal was thereby made to "squirt" it out of the heating holes, whereby the absolutely essential rapid circulation in these heaters is produced. This type of furnace is sometimes referred to as the "pinch effect furnace," as this peculiar force is the underlying and essential feature of it. Such a furnace heats the liquid metal from the bottom which is the correct way to heat any liquid, and of course the most rapid way.

Due to this rapid heating the losses of heat are reduced because the time during which the metal is kept hot, is shortened. If a ton of metal per hour is melted and poured in 500 pound lots every 15 minutes in a small furnace, the continuous stand-by losses through the walls and the top will be only those from 500 pounds, while if melted and poured in ton lots every hour these losses will be several times as great.

Pour Directly in the Molds

The ideal method therefore is to melt and pour as quickly as possible, hence in as small lots as the particular conditions of the foundry require, though this of course need not be carried to extremes. It is thought, however, that for small castings at least, a high power tilting brass furnace of this type could be constructed small enough to be transported to the molds, pouring directly into them, thereby saving the process of pouring with a ladle with its labor cost, and the cost of the superheat necessarily involved in indirect pouring.

In general this furnace consists of a shell lined so as to form a hearth. At the bottom of this hearth there are several cylindrical holes, usually inclined, extending into the lining and terminating at their outer ends by the metallic electrodes, usually made of the same metal as that to be melted, or of graphite. The electric current led into the furnace by means of these electrodes, passes through the columns of liquid metal in these holes and it is here that the electric energy is converted into heat and from which the freshly heated metal is squirted out into that in the hearth. These heating holes are technically called the resistors, as it is the electric resistance of the metal in these holes which causes the electric energy to be converted into heat. The electrodes lead out to the outside of the furnace where they are attached to transformers in which the kind of current required by this furnace is generated. These transformers are preferably secured mechanically to the shell, hence the heating can continue while the furnace is tilting for pouring.

In starting from the cold state this furnace must first be primed with a small charge of liquid metal, enough to fill the holes and the bottom of the hearth, so that the circuit for the current is established. A few fragments of zinc, tin or aluminum inserted in the bottoms of the holes insure the union of the liquid priming metal with the electrodes at the first start from the cold. During regular pouring enough liquid is retained to maintain this electric circuit.

On shutting down the furnace it is tilted or drained so far that the heating holes are also emptied of their metal except for a short stump at the bottom. In some cases the charges in the furnace were allowed to freeze and it was afterwards started up again by melting the solid charge with the current; but at present this is not recommended as a general rule except when the metal in the furnace is not hot short as hot short metal is apt to break the electric circuit by cracking in the resistors when the furnace cools or is heated up. A blast fuel flame is desirable for starting up a furnace with a frozen charge.

An electric furnace has its best efficiency when run continuously day and night; this is also better for the lining, which may become strained by repeated heating and cooling. The cost of electric energy is also generally less per kilowatt hour for continuous than for intermittent supply. When this continuous running is not practical, this furnace may be kept hot over night with about 20 per cent or even less, of its normal input. A large body of metal in a well heated and well insulated furnace will probably keep liquid in the bottom for a number of hours, perhaps all night, without any current.

Any degree of superheat can of course be obtained, depending only on the money one is willing to spend for this superheat. One need merely keep the melted metal in the furnace with the full current on. Owing to the higher cost of electric heat, it is of course desirable to require as little superheating as possible. The ideal method would be to cast directly from the furnace into the molds, by bringing the molds to the furnace, say on a sort of suspended carrousel or by floating them on a canal.

The wearing away of the walls of the heating holes was at first expected to be an important matter, but to our surprise this wear seems to be either negligible or entirely absent even in steel furnaces in which the temperatures are much higher; in these latter they become

Portions of a paper read at the annual meeting of the American Institute of Metals, Chicago, Sept. 7-11, 1914.

coated with a black layer which seems to replace itself as fast as it wears away. In brass furnaces, when care is taken not to let any slag get into the holes on emptying the furnace completely before a shut-down, the walls of these holes remain clean and smooth and are entirely unattached.

The cost of relining, which takes the place of the cost of the crucibles in fuel furnaces, will not be great, being no doubt considerably less than the cost of the crucibles. We have no figures yet, but in the improved type with the heating holes coming in from the side instead of from the bottom, we know that the relining is a simple matter.

The flow of metal in the heating holes is downward at their circumference and upward in the center, hence is in both directions; the outward velocity is by far the greater; there is really a suction at the surface of the holes, hence an absence of erosive action, the flow is steady and not intermittent. We estimate that each particle of metal is in the holes on an average roughly about a second and is heated about 50 degrees Cent. higher than when it entered, but these figures are naturally only very rough estimates and vary greatly with the design and the metal.

It is quite surprising, however, what a large amount of heat can be carried out of these holes effectively by the rapidly flowing metal; it exceeds that of a row of electric arcs in those holes. At present about 25 to 50 kilowatts are converted into heat in each hole, or roughly about 90,000 to 200,000 British thermal units per hour, with the probabilites that this can be considerably increased. The correct proportioning of these holes and the current are of great importance. These proportions are quite different for brass than for steel. The furnace must be especially designed for each metal, though variations in the compositions of brasses and bronzes can however be taken care of in the same furnace by regulation of the electric current.

Even copper with its very low resistance can be melted commercially in these furnaces without requiring impractical proportions. The higher the electrical resistivity of a metal the better the proportions become.

The rapid flowing of the metal in the heating holes, which is the basis of this type of furnace, is a phenomenon based on the use of a large current, hence these furnaces must be operated with low voltages and great amperage. For this reason the currents are best converted by transformers attached directly to the furnace, as long leads for such large currents would be expensive and troublesome.

Our researches have shown, however, that the currents may be much smaller than was at first supposed. Our brass furnace is running with about half the current originally intended and double the voltage. This is due to the development of an unexpectedly high counter electromotive force, which is a very favorable feature, as it improves the proportions of the furnaces, by enabling lower currents to be used. The energy represented by this counter electromotive force is also converted into useful heat.

Under normal conditions the current is perfectly steady, hence these furnaces become a very desirable "load" for central stations, and may for this reason be granted lower rates, especially as the current need not be cut off during pouring, and because the furnace could easily be cut out of circuit (except for a small current to keep it hot) during the time of the so-called "peak" loads, during which the charges for current are necessarily and justly somewhat higher.

Should the ammeter needles start to oscillate it means that the columns of liquid metal in the holes are parting either because the level of the liquid metal above the holes is too low, or in the case of zinc alloys, that the temperature is unnecessarily high, causing some zinc to volatilize and form bubbles in the heating holes. In either case the addition of some cold metal will at once stop it. The operator soon learns how to avoid both.

Any of the usual alternating currents used for lighting or power can be adapted to this furnace, as they are always transformed at the furnace to the required voltage and current. Single phase, two phase or three phase

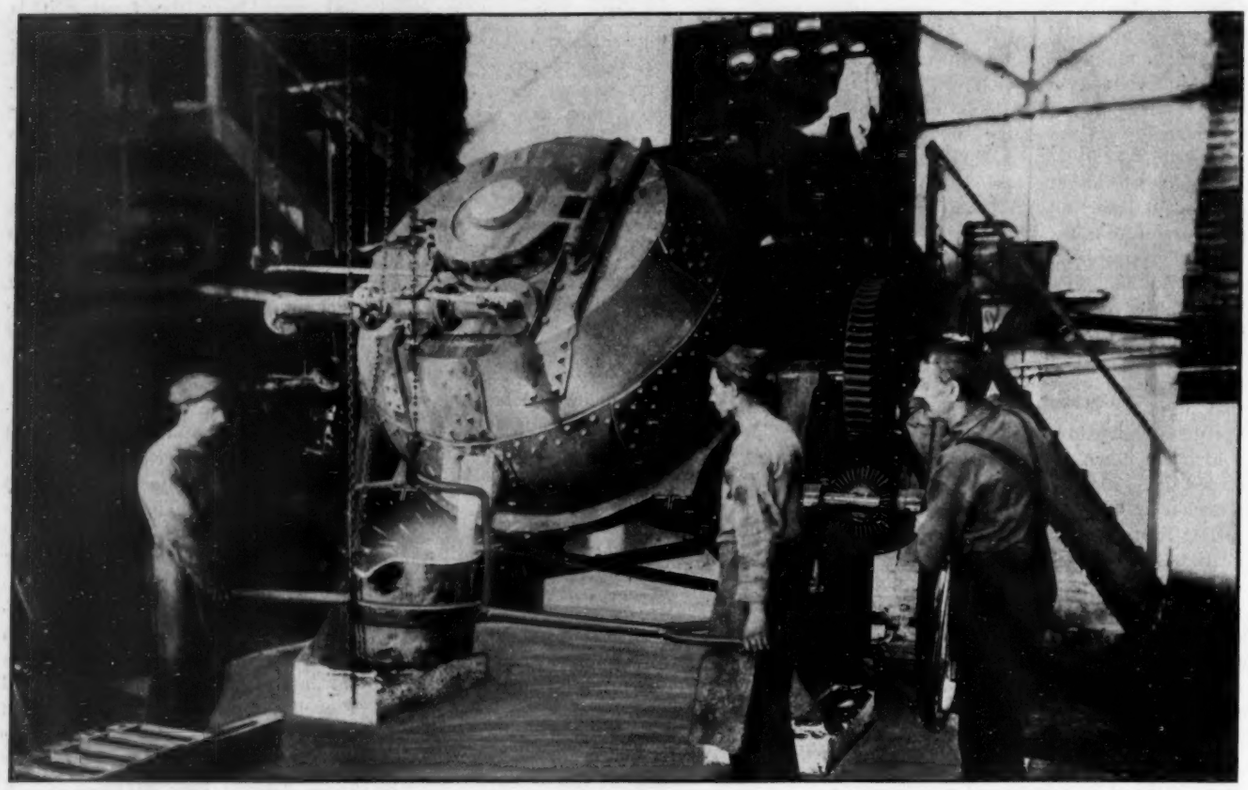


FIG. 1—POURING BRASS FROM A HERING ELECTRIC FURNACE

currents can be used wthout any complications; there being then two, four or three heating holes; three phase current is probably the best and is the kind most generally available. Any frequency may be used, although, of course, the lower the frequency the better. If the supply mains have a dangerously high voltage, it is preferable, on account of the safety and comfort of the operators to first transform the current, in protected places, down to the safe voltage of the usual lighting and power circuits.

The power factor of this furnace, even with 60 cycles, is not low, as has been supposed, but was found to be in the eighties and nineties, and even this small reduction from 100 per cent was no doubt largely, if not all, in the transformers and could be avoided in a better design of the transformers. In a steel furnace with a frequency of 25, the power factor was practically 100 per cent, hence perfect. This factor has nothing to do with the efficiency but merely means larger electrical parts when it is considerably below 100 per cent.

Convenient means for regulating the furnace current without wasting power, are provided at or near the furnace. But, like most other machines, this furnace runs best at the normal current for which it is designed, and the greatest economy is obtained by running steadily night and day, which also diminishes the size or number of furnaces for a given annual output.

The furnaces may be designed with a replaceable shell, so that a spare shell may be kept ready to be substituted, thereby avoiding the loss of time in relining and drying. But as this relining and drying could, in most cases, be done during a Sunday stoppage, no great importance is attached to such spare shells, except in the case of repairs.

As the top and all but one side are free from all electric appliances, the slag or skimming doors, spout, feeding hopper, roof, etc., may be located and constructed as the owner prefers. The furnace may readily be made to tilt around the spout or lip as a center, thereby facilitating casting directly into molds, which, of course, saves considerable expensive superheating and labor.

No accurate tests have yet been made for determining the electric power required per 100 pounds of various copper alloys, partly because this can be determined fairly only during long, continuous runs on the same material and with clean charging scrap, as a large part of the charge is preferably retained in the furnace for facilitating the melting of the next charge. Another reason for not measuring it was because the furnace has so far been used for melting very light brass and bronze chips, which gave trouble in the fuel furnaces. Moreover, in such a test, the temperature should be carefully measured because the power required depends quite considerably on the amount of superheat desired, and this is different with different foundrymen, depending largely on their skill or lack of skill in casting quickly.

In melting many tons of these light, curly and oily brass chips with much mechanically mixed iron, we cast in the form of clean ingots, nearly 8 pounds per kilowatt hour, delivered to the furnace transformers, equal to about 12.5 kilowatt hours per 100 pounds poured; a considerable portion of this energy went into the dross and was lost through the open hopper, through which the cold charge had to be "poked." Moreover, the transformers were not working properly and were wasting much heat, and in this particular furnace there were four electrodes (for a two-phase current), instead of only three (for a three-phase current), which latter would be more general, hence the electrode losses were greater than they would be normally; and the electrodes had been proportioned for a much larger current, hence were unnecessarily wasteful in heat loss.

Short runs, with clean ingot charges, indicated that, even with these easily avoidable excesses in the losses, 10 pounds per kilowatt-hour could be obtained in this furnace, hence, in better designs, even still better efficiencies than this can reasonably be expected. But, as said above, this figure depends largely on the amount of superheat required by the particular foundryman.

It is not fair to any furnace to calculate the actual efficiency in per cent by comparing this figure with the theoretical one, because the latter is not known definitely and may be far in error. Also, because the superheat required by some foundrymen is far greater than that in the assumed theoretical value. What actually is of prime interest to the user is the cost in cents per 100 pounds of good, saleable castings, and this is not dependent on any doubtful theoretical values.

The economy of the electric melting could be greatly increased by preheating the charge with a fuel flame, preferably in an auxiliary furnace, to only such a temperature at which no oxidation takes place. Nearly half the

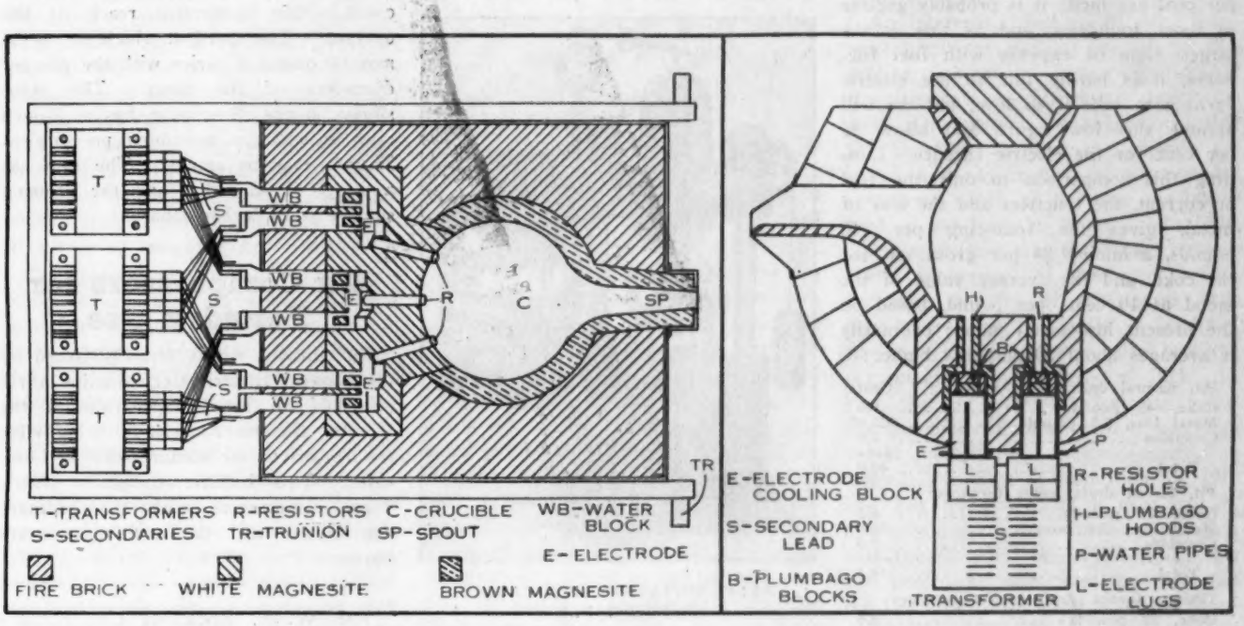


FIG. 2—SECTIONAL PLAN OF ELECTRIC BRASS FURNACE

FIG. 3—CROSS SECTION OF FURNACE

melting heat could thus be introduced into the metal whereby the economy of the electric heating could be nearly doubled. Such low temperature heat is more cheaply produced by fuel, while the high temperature heat is introduced into the metal more cheaply electrically, hence this combination of both gives the best total economy.

Comparative Costs

Comparative costs with fuel furnaces can be only crude because the data concerning them differ so very greatly in different foundries. But taking what appear to be fair general averages largely from the recent Bulletin 73 of the Bureau of Mines compiled by Dr. H. W. Gillett, the following rough comparisons can be made:

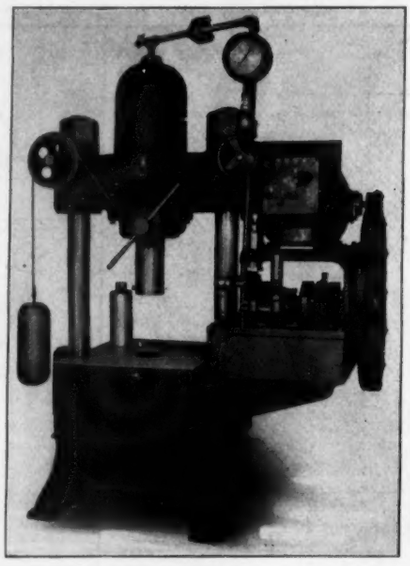
He concludes that the average loss of metal in fuel furnaces is about 2.5 per cent per melt; it is probably greater in most foundries, and as this is the largest item of expense with fuel furnaces, it is hardly fair to the electric furnace to take it so low; but we will assume this low figure and allow ½ per cent for the electric furnace. Limiting this comparison to only the fuel or current, the crucibles and the loss of metal, gives the following per 100 pounds, assuming $4 per gross ton for the coke, and the average value of the metal as 10 cents per pound, based on the present low metal value; ordinarily it averages about 50 per cent higher:

	Cents
Pit, natural draft, coke, furnace:	
Coke, 45 pounds	8.0
Metal loss, 2.5 pounds	25.0
Crucibles	7.0
Total	40.0
Pit, forced draft, coke, furnaces:	
Coke, 35 pounds	6.3
Metal loss, 2.5 pounds	25.0
Crucibles	7.0
Total	38.3
Tilting, forced draft, coke, furnaces:	
Coke, 20 pounds	3.6
Metal loss, 2.5 pounds	25.0
Crucibles	6.0
Total	34.6
Open-flame, tilting, oil furnaces:	
Oil, 3 gal. at 4 cents	12.0
Metal loss 3 pounds	30.0
Relining	1.2
Total (to which should be added the cost of the compressed air blast)	43.2
Electric furnace:	
Power at 1 cent per kwh. and 10 lbs. per kwh.	10.0
Metal loss ½ pound	5.0
Relining	1.2
Total	17.2
Power at 1.5 cents per kwh. and 8 lbs. per kwh.	18.8
Metal loss ½ pound	5.0
Relining	1.2
Total	25.0

The labor cost for charging, pouring and attending to the operation of the furnace may be the same, but the cost of starting the fires and for the handling of the coal and ashes, are absent in the oil and electric furnaces and should therefore be added to costs for the coke furnaces. In the wrought brass industry there is a saving of labor with the electric furnace due to larger ingots, which would no doubt be a much greater item than the difference in cost of melting.

Melting was done at night only, on account of lack of spare power in the works during the day. The furnace was kept hot and at an even temperature during the day with a little less than 20 per cent of the full power. This figure will become still smaller when certain easily preventable losses have been avoided. The hearth held about 1,500 pounds and about half of this was retained to facilitate melting the next charge. The shape of the hearth was not good as it induced bridging of the cold charge; this and other details are readily changed in new designs.

From the foundryman's standpoint



SELF-CONTAINED HYDRAULIC FORCING PRESS

the melting was quite satisfactory, and the ease of manipulation and preventing loss of metal, leaves little to be desired. When closed there was no sensible radiant heat from the outside. Our workmen were found to be drying their shirts by laying them on the top of the furnace while the metal therein was at pouring temperatures.

Difficulties Overcome

The development of this type of furnace involved many difficulties largely because it was an entirely new and somewhat radical departure from existing practice, hence no precedents existed. All the data for constructing it had to be found out experimentally, and each trial furnace had to be run to destruction to bring out its weak points. Our scrap heap contained probably about fifty furnaces. Furnaces of this type must moreover be carefully calculated and designed in their electrical parts or they will not operate satisfactorily.

Hydraulic Forcing Press

The Hydraulic Press Mfg. Co., Mt. Gilead, O., recently has designed a broaching and forcing press which has a number of interesting features. It is self-contained, both the motor and pump being mounted on an extension base which is attached to one side of the press. The general features of the machine are clearly shown in the accompanying illustration. The ram is operated by a two plunger horizontal pump, which is equipped with an automatic knock-out attachment that limits the pressure to a predetermined maximum. A two horsepower motor is provided and the starting rheostat is located within convenient reach of the operator. The speed at which this press may be operated varies with the plunger diameters of the pump. The press shown in the illustration has a 10-inch ram on which a maximum pressure of 75 tons may be applied. The ram has a travel of 12 inches and the pressing surface is 24 inches square.

Air Compressors for Foundry Use

Bulletin No. 42800, recently issued by the General Electric Co., contains a reprint of an article appearing in the *General Electric Review*, covering electrically driven air compressors in foundries. This bulletin compares centrifugal compressors with the ordinary fan blower and the positive pressure blower.

The W. S. Rockwell Co., furnace engineer, 50 Church street, New York City, has issued an interesting comparative scale of Fahrenheit and Centigrade thermometers. The scale is arranged in the form of a circle and covers a range in temperature from 0 to 3200 degrees Fahr. Tables of hardening heats, tempering heats and temperature conversion factors also are given. The whole is printed on a stiff, 9½ x 11-inch card, which may be hung on the wall of the furnace or heat-treating room.

A hard wheel with a narrow face will grind work with less care and thought on the part of the operator, but it is the most expensive grinding that can be done. A wide-face soft wheel with the proper care does much more work per dollar of expense and is the proper combination for economical manufacturing.

Pointed Questions From Court

Prove Somewhat Embarrassing to Judge Dickinson—Decision in Steel Corporation Dissolution Suit Not Expected This Year

Exactly three years and three days from the time the government originally filed its bill in Trenton, N. J., the final argument in the United States Steel Corporation dissolution suit came to an end in Philadelphia on Oct. 29. For eight days, which was double the time as the court had allowed for the purpose, the distinguished lawyers on both sides skillfully debated the many points involved, while the audience, which on occasions thronged the room to overflowing, listened spellbound to the marvellous story of the Steel Corporation—a tale, apparently, not so familiar to the general public as to the iron and steel trade. At the termination of the proceedings, there was almost an audible sigh of relief from all who had actually participated, especially from the lawyers who during the long series of hearings had built up a record of testimony and documentary evidence which, for sheer quantity, seldom has been equaled in a case of this character.

The federal circuit court of appeals which heard the argument, will not hand down a decision this year—that much it seems safe to predict. Further than that, it is idle to speculate. Besides being saddled with the immense amount of work necessary to sort out and balance against each other the points in this case, the court is handicapped by having on its hands two other cases which it heard just before this one. However, when the decision is announced, it will be only a step toward the final result, since it is certain that whichever side loses will carry the case up to the Supreme Court.

To an unbiased spectator at the final argument, it appeared that the defense submitted at least a more consistently prepared case than the government. The Steel Corporation attorneys had each point worked out with care, so that to prove one statement they were not forced to contradict another, as the government attorneys did once in a while. Several incidents which illustrated this weakness of the government occurred during the address to the court by Henry E. Colton. Another incident of the same character occurred during the final argument by Judge Dickinson. He was referring to the proposed tube plant of the Carnegie Steel Co. at Conneaut, O., when Judge Buffington interrupted him as follows:

"Suppose that Mr. Morgan thought he was threatened with destructive competition by Mr. Carnegie. Do you insist that he would not have the right to make the purchase? What do you think was his duty under such circumstances?"

Judge Dickinson's reply was not considered as helpful to his argument. He said this was not in the case and he was not prepared to make an expression on the legal points involved.

"But that is what you alleged in your petition," broke in Mr. Lindabury, of the defense.

"Well, we alleged much in our petition. If you will admit all that was in our petition we will call it a bargain," Judge Dickinson replied with a laugh.

Johnson's Argument

John G. Johnson presented a brilliant and oratorical argument for the defense. The famous attorney, who is reputed on two separate occasions to have refused offers of an appointment to the Supreme Court of the United States, proved a great drawing card. When he made his way to the bar, the audience filled almost every square inch of the court room. When Mr. Johnson began his address, his voice was inaudible throughout the court room and even the judges had to lean forward to catch his words. Soon, however, his voice gathered strength, and it kept on rising until he reminded his hearers of nothing so much as one of the old-school, earnest, shouting, preachers. In a speech characterized by a careful scrutiny of all facts in the light of reason, he summed up the case for the Steel Corporation.

"Our adversaries," he said, "pass over with a sneer the evidence of a great many of the witnesses, some of whom they themselves called. It will not do thus to disregard the weight of the testimony in this record. For instance, they condemn Judge Gary because his recollection of events 15 years old was not perfect. We refer your honors to the record, which is a wonderful monument to his character and ability, erected by the men who knew him and his policies best."

Mr. Johnson declared that the law inhibits only restraint of trade, and hence the prosecution should have endeavored to prove restraint of trade. Instead of that, he said, the government devoted much of its attention to "pools," which, it insinuated, constituted restraint of trade. On the contrary, said Mr. Johnson, the existence of pools proves that there was competition, since a company exercising a monopoly would find it necessary only to issue commands, instead of entering into pools with other companies.

As to the Gary dinners, Mr. Johnson said they were strictly legal.

"The Gary dinners," he said, "were an evidence of honest dealing on the part of the Corporation. Furthermore, the steel companies did no more at these meetings than the government requires the railroads to do. The people at the dinners exchanged information and announced what prices they were going to charge.

An interesting feature of Mr. Johnson's argument was his use of the dissenting opinion by Justice Sanborn in the International Harvester dissolution suit. This opinion, he said, stated that the Sherman act does not provide for relief in equity from a corporation for something which, at the time the bill is filed, it has lost the power to do. Mr. Johnson claimed that the Steel Corporation's proportion of the steel manufacturing capacity of the country has been decreasing constantly in each of the lines it manufactures, also that the percentage it controlled in 1911, the year the suit was filed, was far below the size that maintenance of a monopoly would necessitate. Consequently, he argued, the Steel Corporation in 1911 had lost the power, if it ever had it, to restrain trade. A further indication that the Corporation, in 1911, had lost this power, he said, was the fact that the Corporation had not acquired properties at a sufficient rate to enable it to grow in the same proportion as its competitors grew. In regard to the question whether the original thought in organizing the Steel Corporation was to restrain trade, said Mr. Johnson, it was the duty of the government to prove such a motive.

Mr. Johnson dwelt at some length upon the export trade of the Steel Corporation. Prior to 1901, he said, the export trade in steel was only of a spasmodic character. Competition was so keen here, he said, that Europe had to be used as a dumping ground. With the formation of the Steel Corporation, the purpose of developing a regular export trade first was conceived and worked out. The idea, he said, was to diversify the products and economize in their manufacture to such an extent that it would be profitable to sell abroad.

"And now, he concluded, "you are asked to dismember this great Corpo-

ration; to divide it up into miserable little companies controlling 10 per cent of the capacity of the country in each of their respective products; to render valueless hundreds of millions of dollars worth of securities created by economies made possible in such a large organization; to bring financial loss to thousands of small stockholders.

"If you do this, your honors, this is a picture of what the future will bring about:

"When the present great war comes to an end, there immediately will be a resumption of industrial activity in the belligerent countries, and we again will meet keen competition in the sale of our steel product abroad. Our keenest competitor will be Germany, which country permits and believes in the existence of large, powerful combinations in industry. Opposed to Germany's large combines will be these miserable, little companies of ours. Where will our export trade be then?"

Judge Dickinson, of the government, selected for the climax of his concluding argument the testimony of numerous witnesses that it was the custom in the steel business for competitors to lie to and about each other, deceive each other and break faith with each other until Judge Gary, by the force of his influence, had succeeded in changing all this, bringing about the present era of co-operation, truth-telling and open dealing. Mr. Dickinson argued that human nature ever remains the same. that a leopard cannot change his spots.

"These," he said with emphasis, "are the witnesses to whom the attorneys for the defense allude as honorable men. I challenge this contention and respectfully refer your honors to the record to ascertain what is the self-confessed character of some of these men. I argue that the only thing that keeps these men from dealing unrighteously with each other as formerly is the realization that it pays them to be honest with each other and fair, and that if this were not so, they would at once revert to their original practices. Thus, I submit, the entire steel industry is regulated by a gigantic conspiracy and combination in restraint of trade and normal conditions cannot prevail until this combination be brought to an end."

The Portsmouth Steel Co. has let the contract to the American Blower Co., Detroit, for the following equipment to be installed at once: One 9 x 5-foot steel plate fan, one 9 x 8-foot self-oiling engine, 9,000 feet of pipe coil heaters with casings, one 66-foot wheel fan for exhausting the fumes over the galvanizing pots and one 30-foot blower for the cooling wheels.

Mills Busy

Dominion Company on Double Shift—Rifles for England

Toronto, Nov. 3.—The Grand Trunk Pacific has let a contract to Carter, Halls & Allinger, of Winnipeg, for the construction of terminals at four points in British Columbia, viz., Prince George, Endako, Smithers and Pacific, including round-houses, machine shops and other buildings, involving an expenditure of about $300,000. Work has already started.

The Dominion Steel Corporation has received large orders for soft steel products. The rod mill is busier than it has been for a year and the rail mill is operating on double shift. Steel bars and blooms are being produced on a large scale, and nine out of ten of the open-hearth furnaces are in operation. The rail mill is not working, but is expected to open up shortly. Barbed wire is being produced to the amount of 30 tons per day and large orders amounting to thousands of tons for military purposes had to be refused owing to the impossibility of making delivery.

The Ross rifle factory at Quebec is working on a contract from the British government for 100,000 rifles for delivery within a year. It has now 800 employes and is working night and day, including Sundays. The force will shortly be largely increased and extensive additions are being made to the plant.

Business Retarded

Milwaukee, Wis., Nov. 3.—According to Max W. Babb, vice president and general counsel of the company, the Allis-Chalmers Mfg. Co.'s foreign business has been very much interfered with by the European war. Its foreign agents have and are asking the company to supply some unusual material because the conflict has interrupted channels of commerce, but most of the goods asked for are not even made in the Allis-Chalmers shops. The company merely acts as purchasing agent for these foreign firms. It has an agent at Santiago, Chile, and is represented on the east coast of South America by the American Trading Co., New York. Special investigation is being made of the southern field, but it will require several months' time to ascertain just what can be obtained in the way of orders.

The Pittsburgh Foreign Trades Commission is seriously considering the advisability of sending a representative to England, in an effort to obtain part of the business Germany formerly enjoyed with Great Britain. W. C. Coffin, head of the structural bureau of the Jones & Laughlin Steel Co., a member of the commission, has proposed that a monthly journal, showing products manufactured in the Pittsburgh district, be circulated among importers in foreign countries.

Polite Customs

Must Not Be Ignored in Dealing With South Americans

A. H. Bibler, of Pittsburgh, was elected president of the American Hardware Manufacturers' Association at the closing session of the annual convention at Atlantic City, Oct. 30. The other officers named were Brace Hayden, of San Francisco, first vice president and T. J. Fernley, of Philadelphia, secretary and treasurer. The National Hardware Jobbers' Association also elected officers as follows: W. H. Matthai, Baltimore, president; C. J. Graham, Pittsburgh, first vice president, and F. D. Mitchell, New York, secretary-treasurer. The conventions of these two associations were attended largely and subjects pertaining to the hardware trade received their attention in the discussions and addresses.

President N. A. Gladdings, of Indianapolis, in opening the meeting of the manufacturers, made a vigorous attack upon inimical legislation, which he said was interfering greatly with the conduct of business in the hardware trade. He advised the heads of the factories to take more interest in the selection of state and national legislators as the protection to their interests. An address in a similar vein was made before the jobbers' association by President W. D. Taylor, of Cleveland. Wm. S. Keys, a New York banker, in an address, declared that American aggressiveness would have to be tempered by and adjusted to the polite, easy-going customs of the Latin-American countries before the United States could hope to take the place in trade relations formerly held there by European nations. Felix H. Levy, of New York, analyzed the provisions of the Clayton anti-trust bill. "The only section of the measure," he declared, "which will affect the general business community, is that provision which gives the trade commission power to prevent unfair methods in competition which Congress deliberately failed to define because it was unable to comprehensively state what was intended."

Both associations endorsed the "Made in America" label.

Business News from the Capital

Railroads Appeal for Quick Relief—Attorney for Pittsburgh Steel Co. Protests Against Advance in Rates

Washington, Nov. 3.—In closing their arguments before the Interstate Commerce Commission last Friday in the re-opened 5 per cent case, attorneys for the eastern railroads laid unusual stress upon the necessity of advancing rates on low grade commodities.

Attorney George Stuart Patterson, general solicitor of the Pennsylvania, who closed the arguments, said it was to the vital interest of shippers of low grade commodities to see that the railroads have the proper equipment to maintain their service at a high pitch of efficiency. It was intimated that maintenance of such equipment can be assured only through an increase in those rates. Appreciation was felt by the railroads, he said, for the suggestions made by the Commission in its July decision as to how the railroads might get increased revenue and said, no doubt, when worked out, they would solve economic difficulties, and be a tremendous help to railroads and shippers alike, but urged that this revenue cannot be obtained at once. Emphasis was placed on the need of immediate aid to relieve the critical condition which the railroads were declared to be facing.

Attorney Louis D. Brandeis, special counsel for the Commission, held that evidence taken in the re-opened case had gone beyond the order of the Commission, and that the only new fact presented by the carriers to justify their plea was the European war. He said it was not within the power of the Commission, but rested with Congress, to declare governmental principles. It was pointed out that no specific showing had been made by the carriers as to the injustice of any existing rate, and Mr. Brandeis thought the Commission, if it modified its previous order, would exceed its legal right. Increased revenues, he contended, could be obtained for the carriers through following suggestions made by the Commission.

In his protest, on behalf of the Pittsburgh Steel Co., against advances in rates on iron ore, Attorney Wade H. Ellis maintained that it is not within the power of the Commission to grant temporary increases in rates otherwise reasonable and proper for the purpose of producing increased revenue to the carriers until other plans for obtaining such revenue can be worked out. The unprecedented European war, it was contended by Mr. Ellis in his protest, has affected the financial and economic condition of the iron and steel business proportionately as much as it has affected the railroads. It was stated that, if the act to regulate commerce be construed as extending to the Commission's power to embrace authority to regulate economic conditions of the country, the interests of the Pittsburgh Steel Co., and other shippers of iron ore require as much consideration as those of the railroads. Attorneys Frank Lyon and Charles M. Johnston, representing the Pittsburgh Coal Co., argued against an increase on coal, pointing out that that commodity is already bearing its burden of transportation cost and that coal carrying lines are extremely prosperous.

"We applied to the Commission to grant a re-hearing in view of such facts and changed conditions," said Attorney George F. Brownell, of the Erie, after citing conditions which he said had changed since the July decision was handed down which he held fully justified the granting of the relief sought. It was insisted that the railroads were not asking the Commission to exercise any power beyond its lawful authority. He laid stress upon the fact that the European war had broken down credit facilities of the world; that securities have already declined to a disturbing extent and there is grave danger of a further serious decline.

Stating that the railroads' net revenues have increased as much during the past 16 years as in all the prior years since the steam engine was invented, Attorney Clifford Thorne, representing middle west state railroad commissions and various shipping interests, made the point that railroad stockholders should share the results of the general financial situation as others are doing. He was ironical in his reference to the "water" which he said had been found in certain railroads.

"You propose to increase this tax burden," he said, turning to railroad attorneys, "at the end of a decade of unparalleled prosperity, at a time when under ordinary circumstances you have been able to earn a return above all operating expenses an interest and taxes, ranging from 7 per cent to 9 per cent, on all your capital stock, water and all."

The Pierce, Butler & Pierce Mfg. Corporation Millbrook, N. Y., has been chartered under New York state laws with a capital stock of $2,350,000 to take over the business of the Pierce, Butler & Pierce Mfg. Co., now in bankruptcy, under the reoganization plan of May 11. The company will manufacture boilers, engines, plumbing and sanitary equpment, etc.

Armor Plate

For Battleships is Awarded—Bids on Projectiles Received

Washington, Nov. 3.—Announcement was made last week by Secretary of the Navy Daniels that awards for steel armor plate for the battleships California, Idaho and Mississippi, each requiring the same tonnage, will be made to the Midvale Steel Co., and the Bethlehem Steel Co. The former is to get the tonnage for one vessel and the Bethlehem the tonnage for the other two.

Each will call for the following tonnages:

Class A-1 armor, 4½ to 13½ inches thick, 7,374 tons; Class A-2, turret, 401 tons; Class B, special treatment plates, 290 tons, and Class C, nuts and bolts, 63 tons. The awards are to be made at $425 per ton for the first class, $486 for the second, $465 for the third and $376 for the fourth. The Midvale contract will amount to $3,487,464 and the Bethlehem contract $6,974,968.

Of the five bids 5,000 14-inch armor-piercing shells, opened last week by the bureau of ordnance, Navy Department, the Bethlehem Steel Co. was the lowest at $415 each. Based on this estimate the total would be $2,075,000. Other bidders on this type of projectile included the Midvale Steel Co., $421; the Washington Steel & Ordnance Co., $426, and the Crucible Co., $425. The E. W. Bliss Co. and the American & British Mfg. Co. were the lowest bidders on 20,000 5-inch shells at $12 each, while the other bidder, the Washington Steel & Ordnance Co., submitted a figure of $13.75. On 20,000 4-inch projectiles, the E. W. Bliss Co. was the lowest at $9.50. Other bidders included the Bethlehem company, $9.80; the Tredegear Co., $9.95, and the American & British Mfg. Co., and the Washington Steel & Ordnance Co., $10. The total cost of this material will be $2,500,000.

Problems of Capital and Labor

Industrial Welfare and Efficiency Conference to Convene—Danbury Hatters to Get Hearing—Employers Opposed Bill Proposed in Washington

In accord with the unanimous vote of the first Pennsylvania industrial welfare and efficiency conference held in Harrisburg last year, John Price Jackson, commissioner of labor and industry, has issued a call for a second conference to be held in the state capitol at Harrisburg Nov. 17-19. This conference is held under the auspices of the Pennsylvania department of labor and industry and the Engineers' Society of Pennsylvania. The purpose of the conference is to enable the employers and employes to work out together the great problems before them with reference to increasing the welfare of the employes and the prosperity of the industries.

The conference last year was the most unique and helpful of its kind ever held in the United States. It was attended by approximately 2,000 persons, many of whom were leaders in the labor and industrial world. The gathering this year bids fair to have an even larger attendance and to create even more interest than that of last year.

Hatters' Case

Washington, Nov. 3.—The Danbury hatters' case has been assigned for argument before the Supreme Court of the United States on Dec. 7. The United Hatters of North America brought the case before the Supreme Court on appeal from a judgment of $252,000, being treble damages awarded against the union by a verdict of a jury under Sec. 7 of the Sherman anit-trust act for boycotting the business of D. E. Loewe & Co., Danbury, Conn., hat makers, during the years 1902-03.

Judge Alton B. Parker, New York, and Attorney Frank L. Mulholland, Toledo, O., appear for the union, while Attorneys Daniel Davenport and Walter Gordon Merritt, New York, are counsel for the plaintiffs.

Opposed to First Aid Bill

Seattle, Nov. 2.—In matters pertaining to proposed legislation, there is considerable discussion of and opposition to initiative measure No. 9, known as the first aid bill. This proposed law provides that the employer in whose plant the injury occurs can be assessed up to $100. The workman may choose any surgeon whether competent or incompetent and the fees of the doctor must be paid by the employer up to $100 and above that amount by the insurance fund. The employer is arbitrarily assessed but he has no voice in the disbursement of the fund.

Vigorously opposing this measure as a detriment to the workmen and declaring that it will not afford proper and ample medical attendance, while at the same time imposing a wasteful, unnecessary and unbearable burden on the industries of the state, a large representative gathering of employers from over the state met in Seattle recently and planned a campaign against the measure. Among the arguments advanced against the measure were the following:

"First aid or more plainly medical attendance is as important a question as the question of industrial insurance. Any law intended to provide first aid requires careful study of the question, not only locally but as regards its operation in other states, and if the law is to be satisfactory to both parties concerned, viz.. the employer and the employe it stands to reason that both parties should confer together in its drafting.

"The industrial insurance commission in this state empowered with the administration of the workmen's compensation act, may properly be considered best fitted to offer an opinion on initiative No. 9. The commission was unanimously of the opinion, that initiative No. 9, if made law, would not only fail in its avowed purpose, but would also distinctly cripple the present workmen's compensation act, thus working a double injury on both the employe and the employer affected."

Arbitrators Will Meet

A board of arbitration composed of six members, two representing the employes, two from railroads and two neutral members, the latter to be appointed by the federal board of mediation and conciliation, will meet in Chicago Nov. 9, to take up the matter of increased pay and improved working conditions for enginemen on 98 railroads operating west of that city.

This demand on the part of enginemen almost resulted in a strike, which was averted by the railroads yielding a point in their position and allowing the matter to go to arbitration.

The Youngstown Sheet & Tube Co., Youngstown, O., has installed stokers for eight boilers, aggregating 4,200 horsepower. Installation was made by The American Engineering Co., Philadelphia.

Engineers

Strongly Oppose Bill Now Being Considered in Pennsylvania

Pittsburgh, Nov. 3.—An act to regulate the designing and supervision of practically all public and private utilities in Pennsylvania now is being considered in this state. The engineers' commission appointed July 25, 1913, by Governor John K. Tener has started to hold hearings on the proposed law which will become effective June 13, 1916, unless the commission submits a report recommending that the bill be defeated. Testimony was taken one day last week in this city and hearings will continue at Philadelphia, Harrisburg and other cities before the commission completes its work.

Opinions expressed by engineers of prominence in western Pennsylvania widely differ as to the advisability of adopting a law compelling "professional" engineers to pass a state examination before taking charge of engineering work in this state. The proposed law, far reaching in its scope, includes the iron, steel and allied trades, although none of these was actively represented at the session here Oct. 15. Engineers who testified strongly opposed the adoption of the suggested bill. Some said it is unreasonable, unnecessary and not demanded by the public; others intimated the engineering profession in Pennsylvania would suffer if "thrown into politics."

The commission consists of John Price Jackson, State College, Pa.; Samuel A. Taylor, Second National Bank building, Pittsburgh; George S. Webster, city hall, Philadelphia; F. Herbert Snow, Harrisburg, and J. Murray Africa, Huntington, Pa.

C. J. and F. E. Briner, electrical engineers and dealers in electrical machinery, are preparing to erect a sales room building on three lots they recently purchased on the north side of Morgan street, near Tenth street, St. Louis. The site is being cleared, and the plans are expected to be ready within a few days. The firm is now at 204-6-8 Franklin avenue.

Southland Welcomes Institute

Impressive Meeting at Birmingham

Emphasizes Progress of the South

NORTH MEETS SOUTH

James Bowron, President, Gulf States Steel Co., Birmingham, Discussing the Glories of Dixie with James A. Farrell, President, United States Steel Corporation

A PILGRIMAGE to the south—this phrase sums up the chief characteristics of the seventh meeting of the American Iron and Steel Institute which was held in Birmingham, Ala., on the three closing days of last week, Oct. 29, 30 and 31. Indeed, to a liberal proportion of the 300 odd members in attendance the meeting partook of the nature of a voyage of discovery, in which the explorers were most agreeably surprised at the many evidences of industrial progress and prosperity with which they were greeted. The chief executives of practically all the large iron and steel producing companies in the United States were present and both the quality and quantity of the attendance gave tangible evidence of the high regard that the older manufacturing centers of the north have for the enterprise and ability of the south.

The professional sessions on Thursday and the excursions to various points in the Birmingham industrial district on Friday and Saturday admirably supplemented each other. With two exceptions, the papers and their attendant discussions dealt with the iron and steel industry of the south from historical, economic and technical standpoints. These papers vividly portrayed the tremendous struggles and sacrifices which were necessary to establish the iron industry in the south on a firm footing following the ravages of the civil war; they also pointed out the enterprise of the southern iron masters in trying out new inventions and improved methods of operation and accurately portrayed the conditions with which the southern iron industry finds itself confronted today.

It was, however, in the plant visits on Friday and Saturday that the meeting found its chief expression. The excursions were so arranged that all points in the district were included, enabling the members to see for themselves just what the southern iron and steel industry is. Special trains were provided, supplemented by automobiles. On Friday, Ishkooda mine No. 13, on Red Mountain, was visited, together with the furnaces of the Woodward Iron Co., the water supply system at Bayview, the coal mine and pumping station at Edgewater, the Tennessee company's by-product coke ovens and the works of the American Steel & Wire Co. at Fairfield. The latter plant has a capacity of 400 gross tons per day, the output including plain wire, nails, staples, barb wire and fencing. On Saturday the details of the great plant of the Tennessee Coal, Iron & Railroad Co., at Ensley, were inspected. The Thomas furnaces of the Republic Iron & Steel Co. also were visited. In brief, the Iron and Steel Institute was treated to a moving panorama of the Birmingham industrial district—a vast, living motion picture that will long be retained by the memories of those who witnessed it.

Judge Gary's Address

We turn back now to the formal proceedings on Thursday. The meeting was opened with the customary address of Elbert H. Gary, president of the institute, the major portion of which is printed elsewhere in this issue. Those parts of it comparing the evil effects of unfair and unbridled competition in business to the destruction wrought by warfare were received with unusual applause. Without overlooking the unsatisfactory conditions that exist in the steel trade at present, the address was seasoned with a liberal sprinkling of the well-known Gary brand of optimism.

A paper on "The Use of Steam Turbines for Various Purposes", which was presented by Frank G. Cutler, chief, bureau of steam engineering, Tennessee Coal, Iron & Railroad Co., was published in the Oct. 29 issue of The Iron Trade Review, together with a paper by John Hulst, chief mechanical engineer, Carnegie Steel Co., Pittsburgh, entitled "The Repair Department of a Modern Steel Plant". Interesting discussions of Mr. Cutler's paper were given by Leif Lee and Karl Nibecker, engineers, Youngstown Sheet & Tube Co., and Alexander L. Hoerr, steam and hydraulic engineer, National Tube Co., McKeesport, Pa. The latter was published in part in our last issue. Mr. Hulst's paper was discussed by B. D. Quarrie, general superintendent, Newburgh works, American Steel & Wire Co., Cleveland, and H. L. Bodwell, assistant district manager American Sheet & Tin Plate Co., Vandergrift, Pa. Mr. Quarrie questioned the advisability of operating iron, steel or roll foundries in connection with steel plant repair facilities, and Mr. Bodwell pointed out that steel castings can be made in the open-hearth department for 2c a pound.

F. E. Bachman, blast furnace manager, McIntyre Iron Co., Port Henry, N. Y. read a paper describing experiments with titaniferous ores in the blast furnace. The details of these experiments were fully covered in the Oct. 15 issue of The Iron Trade Review. Mr. Bachman's paper was discussed by R. H. Lee, superintendent, Lebanon furnaces, Pennsylvania Steel Co., Lebanon, Pa., and A. H. Lee, superintendent of blast furnaces, Lackawanna Steel Co., Buffalo. A

paper on the development of the iron and steel industry in the south, by T. K. Glenn, president, Atlanta Steel Co., Atlanta, Ga., contains the following interesting paragraphs:

"The reason why the development in the south has not been faster and more in keeping with other sections of the United States is that there has not been a sufficient demand for pig iron in the southern states. The consumption of pig iron in the United States is about 650 pounds per capita, while in the south I estimate that it is not over 150 pounds. The difference represents the backwardness of the south in the manufacture of finished forms of iron and steel. The present approximate consumption of pig iron in the south is 1,800,000 tons per year. If the south manufactured all the finished iron and steel that it now uses it would probably consume not less than 5,000,000 tons of pig iron. At the normal per capita consumption, the south should use about 10,000,000 tons of pig iron.

"As to the future of the iron and steel trade in the southern district, the past marks a period where the splendid vitality of the iron trade not only kept out irons of other districts but shipped iron into them, while the problem of making steel from southern iron was being worked out. It now has been conclusively demonstrated that from southern ore steel for rails, plates, sheets, structural shapes, bars and wire products can be made of as good and uniform a quality as is made today anywhere else in the world."

Mr. Glenn's paper was discussed by G. W. Connors, president, Conners-Weyman Steel Co., Birmingham, and M. P. G. Hillman, Carpenter & Hillman, Birmingham. "Southern Foundry Pig Iron" was the title of a paper by James W. McQueen, vice president, Sloss-Sheffield Steel & Iron Co. This paper was discussed by L. R. Lemoine, president, United States Cast Iron Pipe & Foundry Co., and Paschal Shook, president, Birmingham chamber of commerce.

At the annual dinner at the Tutwiler hotel, Thursday evening, the

THEODORE W. ROBINSON, FIRST VICE PRESIDENT, ILLINOIS STEEL CO., READY TO TAKE THE TRAIN FRIDAY MORNING

chief feature was a paper by James Bowron, president, Gulf States Steel Co., Birmingham. A portion of this paper was published last week and the remainder appears elsewhere in this issue.

In a few impromptu remarks before reading his paper, Mr. Bowron said he felt that after 15 years of persecution by irresponsible politicians the iron and steel industry has a right to strike back. We are now enduring, he said, the results of a policy of tariff tinkering, merchant marine inactivity and interstate commerce commission watchful waiting.

James A. Farrell, speaking after the dinner, said in part:

"It is perhaps not generally appreciated that the south is one of the greatest exporting sections of the United States. The export of its cotton alone last year was twice the value of the total exports of iron and steel from the United States, but in the export of iron and steel the south, and especially the Birmingham district, has demonstrated that it is a factor to be reckoned with in competition with the manufacturers of the world. Its pig iron and its rails have found their way in increasing quantities to China and Japan, to Australia, South Africa and South America, and it is even now executing orders for rails for Siam, billets for England, pig iron for Italy, Japan, Australia and other countries.

"In considering the position of the south as a factor in the commerce of the world, many members of the institute will naturally think in terms of profound sympathy for our brethren in the European steel industry now engaged in what seems to us, in view of our former close friendship with them and theirs with each other, a fratricidal struggle. The great calamity of this war and its evil effect upon ourselves, in common with every other nation of the world, is made almost personal to us in contemplation of what it means to the steel industry of Europe and our friends in that industry, who by their visits to this country and our visits to them have cemented the ties of friendship for many years.

"The first three months of this war,

(*Continued on page* 881.)

THE BARBECUE AT BAYVIEW
In the Foreground Are E. J. Buffington, President, Illinois Steel Co.; Willis King, Vice President, Jones & Laughlin Steel Co. and Judge Gary

ENTRAINING AT ISHKOODA
The Elevation at This Point is 950 Feet, Affording a Splendid View of the Surrounding Country

SHOULD BE THE CENTER OF WORLD

Judge Gary Says United States Should be the Leading Country

And Will Be if it Gets Out of the Rut of Antagonism---Makes Earnest Plea for Conciliation in Business and Among Nations---Recalls Visit to Belgium ---Says Manufacturers Would Have Prevented War

Judge Elbert H. Gary, in his address before the members of the American Iron and Steel Institute, at Birmingham, Ala., Thursday, Oct. 29, expressed his faith in the wonderful possibilities of this country. "If," he said, "we can get out of the ruts of antagonisms, inconsistency, distrust, hypocrisy, individual indifference to the rights and interests of others, which seem to have prevented natural and legitimate progress during the last few years, so that the people generally will disregard undue personal ambition and will work together, joining hands for the protection and promotion of the welfare of all alike, having a disposition to utilize to the best advantage the privileges which this country affords, it will be only a question of time, and short at that, when the United States will be firmly established as the leading country of the world. Times and conditions are auspicious. The United States, with its vast wealth and resources, should be the financial, industrial and commercial center of the world; and to a corresponding degree will be opportunities for worthy achievement in every direction. To the extent that we prosper legitimately and without prejudice to the rights or interests of others we may be able to render assistance to others who may need and are willing to accept it.

It is wise for all of use who are here today to place our faith in the wonderful possibilities of this country. In this connection, it is to be remembered there is a growing sentiment throughout the country in favor of just and fair treatment to all the people and all departments of human endeavor. There is a decided change for the better in this respect. Much has been said during the last few years in favor of according full attention to the rights of individuals, particularly those less fortunate in the contest to acquire the comforts of life; and this is right and must not be minimized nor interfered with; but in discussing these questions writers and speakers have sometimes been unreasonable in placing the blame for objectionable conditions. However, it now seems clear that in the future greater regard will be had for the rights and interests of all classes of the people without discrimination. Equal justice will be done to all, rich or poor, strong or weak. Politics or partisanship will not be used to obstruct the normal and legitimate growth of the country; and one of the most gratifying and encouraging signs of the times is the attitude of the leaders in public discussion and of the administrators of public affairs."

Business Conditions

In opening his address, after speaking in complimentary terms about Birmingham, and commending the work of the American Iron and Steel Institute, Judge Gary discussed business conditions. He said that he is an optimist in principle and believes there is always a bright side, although it may be temporarily obscured. Nothing, he said, would be gained by closing our eyes to well-known facts about the present business depression, but it is well to consider fundamental facts and favorable indications. He referred to the fact that of the eight and one-half billion dollars of gold held throughout the world, the United States is possessed of considerably more than one-fifth. He also referred to the great productive capacity of the United States, to the increase in exports, and said he believed it safe to predict that in many important respects business conditions in the United States in the next three months at least will be better than they have been for the last three months. "As to the long future," he said, "I do not hesitate to say with emphasis that the opportunities for progress and success in this country are greater than ever before."

Judge Gary next referred to the visit of the American iron and steel manufacturers to Europe. He said:

"About three years since, a few of us had the privilege of meeting in Great Britain and Continental Europe the leading representatives of the iron and steel manufacturing interests of the world. For several days we were in close association with those men and became well acquainted with them and the spirit and motives which dominated their attitude and treatment of one another. The countries represented included England, Scotland, Wales, Belgium, France, Germany, Austria, Italy, Russia, Spain, Hungary, Canada and the United States. All were pecuniarily interested in the iron and steel industry. All were active competitors, individual concerns of a single country with each other and each country with all other countries. While those engaged in many respective lines of manufacture were protected to a considerable extent against ruthless and destructive antagonisms by virtue of cartels or arrangements, recognized, if not fostered, by the chief authorities of their respective countries, yet there existed rivalry and competition which might, and at times no doubt did, produce feelings of envy and dissatisfaction. Nevertheless, it was evident that a feeling of business friendship per-

meated the minds and influenced the conduct of these men, and this in the main tended to establish and uphold an orderly and profitable management of the affairs entrusted to them. And the disposition shown towards and the hospitality extended to the Americans by all others on this occasion secured for them our everlasting gratitude and esteem. Those of us who were enabled to participate will never forget the incidents connected with our visit in England, Belgium and other places, or the disposition shown by every one to evidence his respect for and confidence in his rivals in business. Also, we remember, with grateful appreciation, the cordial reception given to us by the King of Belgium, and the interest he manifested in the business welfare of the representatives of other nations. In passing, I will add that if the large numbers of business men who represented on this memorable occasion all of the countries engaged in the iron and steel industry could have had opportunity to consider and determine the questions leading up to the war which is raging in Europe there would have been no war. These intelligent, experienced, practical, sensible and christian men, being from time to time in close contact, and therefore well acquainted with each other, would have been patient, considerate and fair-minded and would have made adjustments and reached conclusions calculated to protect the interests of all and to prevent the possibility of the present deplorable hostility."

Losses of War

Continuing to discuss the European war, Judge Gary spoke of the tremendous losses of life and property. More than anything else, the anguish of mind on the part of survivors is something which cannot be described or measured. Without attempting to locate the blame for the war, Judge Gary said that in his opinion the struggle for commercial supremacy was the underlying cause, or at least had a decided influence upon its precipitation. "And many believe," said he, "that if representatives of the different nations had previously met in a spirit of friendly and considerate inquiry for the purpose of definitely and finally settling the financial interests of each, all trouble would have been averted."

As to the final result, Judge Gary said that the nation that wins will surely lose, because the enormous cost and the long-continued suffering on the part of the survivors will not be fully covered by any success or glory or indemnity. He said he believed in a positive and binding agreement of all nations for the final settlement by arbitration of all international disputes on a basis to be decided by a competent and impartial tribunal and for the enforcement of decisions by nations not personally involved in the question at issue. "Such an agreement," he said, "could be made, such a tribunal could be permanently established and such an enforcement made practical if the nations were so disposed."

Continuing, he said:

"These ideal conditions may never be brought about. Human nature is the same the world over. It is selfish and inconsiderate. Might too often makes right; the strong become arrogant, unreasonable and aggressive; the evil-minded is reckless and indifferent. I am not willing to admit that the majority of individuals are controlled by these infirmities. I think the average man is honest and fair-minded and desires to be just towards his neighbor; and that the world is growing better. I hope the time will come, even though not in my time, when wars and rumors of wars shall cease.

"All that I have said applies forcibly to our business. We who are here today are engaged in competition; we are naturally selfish; we are often inconsiderate and indifferent. In representing the interests of those who place us in official position, we feel obligated to strive for success, and we go beyond reason or justice. As many of you have remarked at previous meetings, it was customary in the days gone by to harbor the same feelings and to pursue the same line of conduct in the iron and steel trade that have been exhibited in the European conflict. Business men struggled for revenge, or conquest, or suppression, or other reasons just as bad. The graves of concerns destroyed were numerous; this has lately been testified to in open court by those who were familiar with the subject.

"As bearing upon these conditions I quote from an address made on a certain notable and well-remembered occasion by one of your number:

> "'The old basic principle was based on a distrust of one's competitors; on the feeling that, to succeed yourself, you must crush your rivals; and on the solid belief that they were mean enough to feel the same toward you. As a result, every man went out knifing for his competitors; an industrial panic ran like wildfire. The smaller concern went down to ruin, and the stronger, which worried through to harbor, required financial experts to heal or to hide its wounds. No one benefited by this—all suffered, manufacturer and consumer alike.'

"Today I congratulate you on your success in bringing about a new order of things in business. You have become well acquainted; you have confidence in each other; you believe what is told you; you recognize the interests of your neighbor; you are glad when he prospers and equally sorry when he fails of success. You have a better and clearer understanding of business obligations. You can faithfully represent your stockholders, or the owners of your properties and indulge in the keenest competition, without doing anything that is destructive and oppressive, or unfair.

"This institute at the outset adopted, by tacit consent at least, as one of its principles, the following sentiment:

> "'Real, hearty, cheerful and continued co-operation on the part of the members will secure results which should be entirely satisfactory. Frank and friendly intercourse; full disclosure of his business by each to the other; recognition by all of the rights of each; a disposition to assist and benefit each other so far as practicable and proper; conduct founded on the belief that healthy competition is wiser and better than destructive competition.'

"One of the fundamental principles of this institute is comprehended by the words 'conciliation' and 'co-operation'. This should never be abandoned or modified. It should be extended to every branch of our activities. Nothing is to be gained and much is to be lost by antagonisms Communities succeed or fail together. Competitors in trade, producer and consumer, employer and employe, the private individual and the public—all secure the best results if they work together. The success of one on legitimate lines means the benefit of all, and the failure of one means loss to all. The more we consider these questions, the more clearly we realize that what I have said is true. But the unreasonable critic or agitator is the enemy of mankind, including himself. He obstructs and destroys and he does not create or improve. One who is controlled by selfish, unfair, or dishonest motives—even though he may secure a temporary advantage—will never receive any lasting benefit. This applies to all classes of people and to every department of life. It applies to us in considering our attitude and

conduct toward others, and, with equal force, to those whose action or disposition affects us. If we are sincere and fair in our treatment of others we may hope for similar treatment by them. If we are diligent in trying to ascertain the good in others, they may see some good in us. The members of this institute will do their full share in the general endeavor to add to the material and moral strength and growth of the nation."

Southland Welcomes Institute

(*Continued from page* 878.)

which all of us hope will not be greatly prolonged, has demonstrated that we are confronted by conditions never before imagined and that it is necessary to consider new methods of conducting business along lines in which there has been, in our lifetime, no precedent. That chaotic business conditions resulted immediately from such a cataclysm, including the destruction of property, financial stress and the dislocation of the world's commerce, has not been surprising; that the United States has not suffered more, that we have been enabled to maintain confidence in the stability of our institutions, and in the ultimate recovery to normal conditions, is a matter of congratulation. That buying in many lines has been contracted to cover only immediate needs has perhaps been natural, but if reports from numerous centers of consumption may be credited, many warehouses are comparatively bare of supplies, retrenchment has been overdone, and with the cordial co-operation of the various departments of the government in devising measures to assist in financing the cotton crop and providing suitable financial machinery, with the influx of demand for materials for foreign consumption, many of which have never before been exported in such large quantities from this country, with the exercise of the ingenuity of our people in manufacturing for our own consumption articles heretofore imported from abroad and thereby giving employment in new lines of industry, it may not only be reasonably hoped but expected with assurance that with the beginning of a new year, with the settlement of all these vexatious and onerous difficulties, a new era of expanding business will dawn.

"This country has never failed to overcome every obstacle. We have all seen how, from the desolation and despair of the civil war, the south has risen triumphant and taken its place as the factor in the world to which it was destined by its natural resources and the courage of its people. Even so this country, which has suffered from the effects of the European war in every other respect save the loss of men and property, almost as if it were a belligerent, is bound to rise victorious over its vicissitudes, its people animated, energetic and confident from coping with and conquering every difficulty."

In addition to Mr. Bowron and Mr. Farrell, very brief remarks were made by the following: L. E. Block, vice president, Inland Steel Co., Chicago; E. M. Hagar, president, Universal Portland Cement Co., Chicago; R. M. Edmonds, editor, *Manufacturers Record;* A. I. Findley, editor, *The Iron Age;* John A. Penton, managing editor, THE IRON TRADE REVIEW; Willis L. King, vice president, Jones & Laughlin Steel Co.; George G. Crawford, president, Tennessee Coal, Iron & Railroad Co., and Uncle Joe Butler, of Youngstown.

The entertainment features of the meeting were complete and enjoyable, including a complimentary dinner to Judge Gary by the Birmingham Newspaper Club, a tea-dansant at the Southern Club, a ball at the Country Club, automobile excursions and other features.

A Unique Mining District

THE Iron River district of the Menominee range is unique among mining fields of the Michigan and Minnesota ranges. While other districts usually have only a few operators, the Iron River field has practically all of the large mining companies within its borders. The district roughly is a square, 6 x 8 miles, and during the past few years has been enjoying a boom consequent upon the opening of new deposits on the western Menominee.

Among the companies in the field are the Cleveland-Cliffs Iron Co.; the Oliver Iron Mining Co., Riverton group of mines; Verona Mining Co., Baltic, Fogarty, Bengal and Caspian mines; Mineral Mining Co., Wauseca and James mines, Brule Mining Co., Chatham and Berkshire mines; Wickwire Mining Co., Cortland, Homer, Virgil and Wickwire mines; Jones, Laughlin Ore Co., Forbes mine; Davidson Ore Mining Co., Davidson mine; Bates Iron Co., Bates Mine; Crystal Falls Mining Co., Baker and Tully mines; Republic Iron & Steel Co.; Munro Iron Mining Co., Chicagon, Hiawatha and Rogers mine; Enterprise Mining Co.; Minneapolis & Minnesota Mining Co.; Swallow & Hopkins; Huron Mining Co., Youngs mine, and Spring Valley Iron Co., Zimmerman mine.

The Edwards Mfg. Co., Chicago, has changed its name to the Edwards Valve & Mfg. Co. The company's works are located at 2128 West Forty-ninth place, Chicago.

Money Making

Not the Best Thing in Business, Said Gary at the Newspaper Banquet

Birmingham, Ala., Nov. 2.—"The time has come when we should all recognize the fact that there is something better in business than the making of money," declared Judge Elbert H. Gary, at the banquet given in his honor by the Birmingham Newspaper Club last Friday night.

The Gary dinner was one of the happiest features of the meeting of the American Iron and Steel Institute in Birmingham last week. It was attended by President Farrell and Mrs. Farrell, Mr. and Mrs. Gary, the officials and directors of the institute, their wives and lady guests as the guests of honor. The presence of practically as many ladies as gentlemen gave a color to the affair that usually is lacking at such banquets.

The gridiron features of the dinner were very successful. Speeches were made by Mr. Gary, "Uncle Joe" Butler, of Youngstown; Willis King; George Ward, president of the Birmingham City Commission, and others. Mr. Gary in part said as follows:

"We get more pleasure, more comfort and more profit if we consider the feelings and interests of our neighbors. Ladies and gentlemen, the time has come when we all should recognize the fact that there is something better in business than the making of money. If Mr. Crawford has done something to better the conditions of men under him he correctly represents us, correctly represents the sentiment of the Steel Corporation. I say to the newspaper men, come and see, get closer to us, look into our hearts and judge us as you would like to be judged. The power of the newspapers at the present time in this country is greater than ever before and with that power gaining, we may look to the general betterment of conditions in this country. Never before has there been such opportunities for success and never before has the influence of the newspapers been so widely needed."

The Simonds Mfg. Co., Pittsburgh maker of cut gears, worms, worm gears and special machinery has installed a rack cutter to cut racks up to 3 inches. The cutter was made by the Walcott & Wood Machine Tool Co., Jackson, Mich.

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

THE foreign angle continues to loom up as the factor of most importance in the machinery market. The business placed, as well as the new inquiries issued during the past week, indicate that the foreign demand for American machinery as yet is showing no signs of abating. The most of this demand, naturally, continues to come from the belligerent countries in Europe. One of the leading events of the week was the purchase by a Brooklyn concern of forty 14-inch and 16-inch lathes, six automatic screw machines, a number of grinders, cutting-off machines and other machinery for use in manufacturing shrapnel and projectiles. The Bethlehem Steel Co., it develops, has purchased the following machinery: Forty-two Gridley automatics, thirty-eight 20-inch projectile American lathes, sixteen 16-inch Reed lathes, five 20-inch projectile Pond lathes, thirty Steinle turret lathes, twenty-five Warner & Swasey turret lathes and a large quantity of tool room and other equipment; a considerable portion of this machinery was bought last week. This equipment will be used for manufacturing ordnance. A New York house has received large orders for miscellaneous machine shop equipment for shipment to Russia and France and, to a less extent, to England. Large orders for automatic screw machines were placed for export, the National Acme Mfg. Co., Cleveland, alone, having booked 53 multi-spindle machines for shipment to England. The Baldwin Locomotive Works, Philadelphia, has closed for between 100 and 150 lathes on account of the Russian government. An exporter in New York has received inquiries for some 50 turret lathes, plain lathes, and grinders, for France, and 18 grinders for Italy. These inquiries for grinders are in addition to some 100 the preceding week, through a typographical error, reported in THE IRON TRADE REVIEW as 1,000. Another New York exporter, G. Amsinck & Co., 6 Hanover street, is receiving bids on machinery for railroad shops in East Africa, prices to be in the hands of the African buyer on Dec. 26. This list involves five drills, two slotting machines, three milling machines, six shapers, three planers, one hydraulic press, one testing scale, twenty-nine lathes, one foundry cupola, one steel furnace, one converter, twenty blacksmith shop tools, nine boiler shop tools, ten truck shop tools and 13 carpenter shop tools. During the past two weeks there has been a fair demand from Canada for all kinds of machinery, especially such as is required for the manufacture of ordnance. There also have been fair orders from South America for woodworking and machine shop equipment. The Cleveland Punch & Shear Works Co. took one order for two large punches for Peru. There is prospect of a fair demand for general equipment from Australia, and Japan shortly is expected to develop into a buyer of navy yard equipment. The navy department at Washington, threw out bids for 16 shipyard cranes for Boston and Philadelphia, received Oct. 3, and has changed the specifications and reduced the original number to nine; bids will be received on these until Nov. 6. Cyrus Currier & Son, Newark, N. J., have bought a 5-ton Whiting crane, and the Addyston, Pa., plant of the United States Pipe & Foundry Co., purchased a 10-ton Cleveland crane; with the exception of these developments, the crane market is quite flat. The Transcontinental Railway of Canada is preparing a large list of specifications for machinery for new shops near Quebec. Jersey City, N. J., and Syracuse, N. Y., shortly expect to have out lists of equipment for vocational high schools. The New York Central railroad, after recently pruning the list issued some time ago, evidently has forgotten that it needed this machinery and the Lehigh Valley continues inactive on the list issued about two months ago for its Sayre, Pa., shops; in fact, there is absolutely no activity on the part of the railroad purchasing departments. The improvement in the small-lot demand from general manufacturing companies in the east, reported in last week's issue of THE IRON TRADE REVIEW, continues.

Dealers in machine tools in Chicago have experienced but little increase in business as the result of buying by foreign users, although the movement of tools as a result of the European war has given the trade in general somewhat of an uplift. These purchases have been for the most part direct from manufacturers and agents have not participated. Trade in second-hand tools is more active than for new tools, indicating a desire to economize as far as possible. The American Can Co. recently bought a shaper, a lathe and several small tools, aggregating about $2,000, for its plant at Ogden, Utah. In Milwaukee machine tool builders are experiencing somewhat better conditions than have prevailed through the summer and operating schedules are being strengthened somewhat to meet the increased demand. Builders of pumping machinery especially are receiving good orders.

In Cincinnati, orders for lathes continue to come in from foreign sources. The Cincinnati Iron & Steel Co. has taken an additional order of four carloads of 14, 16 and 18-inch engine lathes for shipment to England, Russia and Sweden. This consignment will be divided between four firms. This company recently took an order for 35 similar lathes from Italy. An inquiry for 400 lathes from a manufacturer of cream separators in Stockholm, Sweden, is still before the market, but it is known that at

This illustration shows a large Sheet Steel Storage and Shear Room. Fully realizing the terrible strain and abuse to which the flooring in this building would be subjected, the owners specified **Ayer & Lord Interior Wood Blocks.**

If you don't right now, you will later on!

You will what?

Why, you will need FLOORING REPAIRS—that is, unless you are already equipped with **Ayer & Lord Interior Wood Blocks.**

WHY NOT GET BUSY RIGHT NOW—

Right now while things are not quite so rushed, is a good time for you to start some of your employes figuring up just what the cost of your floor maintenance really is; just how much it **has** cost you in the **past;** just how much it **will** cost you in the **future.**

Also tell them to estimate in, once in a while, some of those costly delays that were due entirely to **floor troubles.**

Then look over the figures carefully. You'll be astonished at the way the **first cost** of the ordinary floor multiplies itself.

Yes—first cost is worthy of consideration, but maintenance is a cost few take into consideration when selecting a floor, and a cheap floor never fails to be an unending drain in money, time and efficiency. Anticipate after results—

You'll see it when YOU have all the facts.

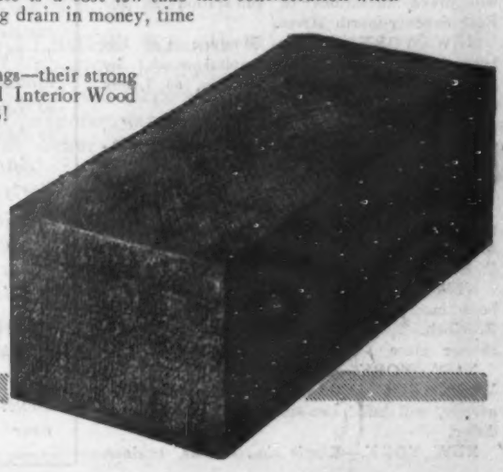
AYER & LORD INTERIOR WOOD BLOCKS — Always Easy on the Feet

Have some of your employes gather all the data they can on **other** floorings—their strong points, their weak points. Have them write for our data on Ayer & Lord Interior Wood Blocks. Then make your decision, and make it only on ACTUAL MERITS!

AYER & LORD WOOD BLOCKS PROFIT BY COMPARISON

They make not only the best floor **complete,** but also are unrivaled for repairing jobs of all kinds.

Write today for our little booklet "FLOORS".



Ayer & Lord Tie Company

General Office: Railway Exchange, Chicago

CLEVELAND, O.—801 Swetland Bldg. ST. LOUIS, MO.—554 Pierce Bldg
KANSAS CITY, MO.—1117 Rialto Bldg. MEMPHIS, TENN.—1402 Exchange Bldg.
PHILADELPHIA, PA.—319 Perry Bldg.

least part of this has already been closed. Manufacturers of lathes in this city are running full time in most cases, as the orders have been pretty well distributed. It is thought by machine tool makers here that all the stock lathes in the United States will be exhausted before another two months. Some small orders for drills and milling machines also have been taken, but these have not been as heavy as for lathes. The demand for other machine tools remains very quiet. Orders from users in the United States are few and show no improvement, and were it not for the inquiries from European sources, the machine tool market would be as dull and discouraging as it was in June and July. It is expected that the orders mentioned above will keep local plants busy for about two months.

EASTERN STATES

PORTLAND, ME.—Globe Portable Saw Co., maker, has been incorporated; $300,000 capital stock; H. O. Smith, president, South Portland; A. L. Emery, treasurer, Portland.

MANCHESTER, N. H.—Manchester Traction, Light & Power Co. is having plans drawn by French & Hubbard, Boston, for two sub-stations.

BOSTON, MASS.—Atlantic Rubber Co. has let contracts for construction of two-story, 56 x 98-foot plant.

FRANKLIN, MASS.—Massachusetts Waste Co. is having plans prepared for erection of three-story waste factory.

NEEDHAM, MASS.—Needham Tire Co. has been incorporated; $350,000 capital stock; by John S. Patterson, William H. Burgess, Howard W. Long, W. Louis Williams.

WALTHAM, MASS.—Waltham Foundry Co. has been incorporated; $48,000 capital stock; by Anthony A. Curtin, Thomas I. Curtin.

BRIDGEGPORT, CONN.—National Lock Washer Co., W. C. Dodd, president, contemplates the erection of a one-story power house.

GREENWICH, CONN.—Thomas Crump will build a $12,000 two-story, 54 x 103-foot factory and storehouse.

NEW HAVEN, CONN.—Winchester Arms Co. has let contract for the construction of a four-story, 50 x 110-foot addition.

STAMFORD, CONN.—Richards & Co. are erecting one-story, 55 x 60 and 45 x 85-foot plant.

BROOKLYN, N. Y.—Brooklyn Rapid Transit Co. will build an addition to a sub-station at New Utrecht avenue and Sixty-third street.

BUFFALO, N. Y.—Taber Pump Co. has let contracts for additions recently mentioned in THE IRON TRADE REVIEW.

EDWARDS, N. Y.—Northern Ore Co. will begin work at once on proposed three-story mill.

MORRIS HEIGHTS, N. Y. — New York Yacht, Launch & Engine Co. will build 50 x 105-foot structure, with 30 x 50-foot wing. Fletcher, Thompson, Inc., 30 Church street, New York, engineers.

NEW YORK.—Interboro Rapid Transit Co. will make alterations to sub-station at 503 East Seventy-fourth street.

NEW YORK.—Unique Machine Co. has been incorporated; $5,000 capital stock; by J. Kleidmann, A. and I. Coleman, 63 Lenox avenue.

NEW YORK.—Howard Specialties Co., metal specialists, has been incorporated; $10,000 capital stock; by W. W. B. and M. L. Brandt, 1063 Eastern Parkway, Brooklyn.

NEW YORK.—Ashley Steel Building Co., portable steel buildings, has been incorporated; $5,000 capital stock; by A. Schwoerer Jr., T. C Brenn, J. R. Ashley, Passiac, N. J.

NEW YORK.—K-T Lever Spring Co. has been incorporated; $50,000 capital stock; by E. Koeb, T. Johnson, W. F. Cornell, 20 Exchange place.

NEW YORK.—Liberty Glace & Netting Works, East 228th street, and Bronxwood avenue, will build two-story, 55 x 110-foot addition.

NEW YORK.—Kipnis Co., chucks, engines, machinery, has been incorporated; $25,000 capital stock; A. Hirshon, L. Pollack, A. Kipnis, 223 Bay Thirty-first street, Brooklyn.

NEW YORK.—Louvain Construction Corporation has received its charter; $10,000 capital stock; A J. Peck, J. V. Simpson, G. W. Alger, 611 West 110th street.

NEW YORK.—Quarrie Soil Vitalizing Co., agricultural apparatus, machinery, chemicals, has been incorporated; $10,000 capital stock; by C. Sidney Taylor, J. C. Teneyck, G. Quarris, 230 West 116th street.

NEW YORK.—Reilly Maintenance Corporation hoisting machinery, hardware, contracting, has received its charter; $5,000 capital stock; incorporators, R. J. Norman, H. J. Sayers, W. F. Reilly, 122 Center street.

NIAGARA FALLS, N. Y.—Santo Rubber Co., Oliver building, Pittsburgh, will erect a two-story, 82 x 250-foot factory here.

ORANGEBURG, N. Y.—Fibre Conduit Co. will erect one-story, 44 x 66-foot power house.

PORT JEFFERSON, N. Y.—Finley Robertson Porter Co., motors, engines, bicycles, has been incorporated; $100,000 capital stock; by F. D. Veiller, F. Robertson Porter, East Clinton avenue, Trenton, N. J.

SYRACUSE, N. Y.—Lefever Arms Co. will build one-story, 38 x 70 foot machine shop, Taber & Baxter, architects, taking bids.

SYRACUSE, N. Y—Chamber of Commerce has named a committee to make recommendations as to the type of freight handling machinery which should be erected at the Syracuse barge canal terminal.

SYRACUSE, N. Y.—Plans for proposed three-story, 200 x 233 foot vocational high school, are being completed by Architect Jas. A. Randall, and contracts will be awarded before end of year. Construction is to begin in spring.

TOMPKINSVILLE, N. Y. — Lighthouse inspector will take bids until Nov. 10 for two Scotch marine boilers.

TOMPKINSVILLE, N. Y.—American Dock Co., New York, will erect a seven-story warehouse in Tompkinsville.

CHESTER, PA. — Stevenson Cold Storage Door Co. will erect a one-story, 95 x 100-foot storage warehouse.

DOWNINGTON, PA. — H. W. Hatton, Equitable building, Wilmington, designing system of sewers and sewage disposal plant for Downington; $100,000.

ERIE, PA.—Erie Iron & Steel Co. has been incorporated; $5,000 capital stock; by I. H. Emerman, Erie; M. V. Emerman and B. Emerman, Cleveland.

ERIE, PA.—G. H. Gumbs, superintendent of the Philadelphia & Erie (Pennsylvania) railroad, has conferred with Mayor W. J. Stern with a view to joining in the grade crossings elimination plans of the municipality and Lake Shore railroad through which iron and steel overhead bridges costing about $1,000,000 will be built.

LANSFORD, PA.—Panther Valley Electric Railway, Heat & Power Co. will erect two-story, 40 x 40-foot substation.

LUZERNE, PA.—Pettebone & Lewis, Wilkesbarre, Pa., have plans for a $50,000, two-story school house; address school board, Luzerne.

McKEESPORT, PA.—Board of school directors has accepted plans for $207,000 high

Trade Tips Tersely Told

IF YOU are busy, you will find the essence of the week's new business items in this column. These items have been carefully selected for their value to the man looking for orders. Here they are:

G. Amsinck & Co., exporter, 6 Hanover street, New York, is receiving bids on machinery for railroad shops in East Africa, prices to be in the hands of the African buyer on Dec. 26. This list involves five drills, two slotting machines, three milling machines, six shapers, three planers, one hydraulic press, one testing scale, 29 lathes, one foundry cupola, one steel furnace, one converter, 20 blacksmith shop tools, nine boiler shop tools, ten truck shop tools, and 13 carpenter shop tools.

United States Engineers, Couch building, Portland, Ore., will receive bids until Dec. 7 for the erection of eight steel bridges across the Dalles-Celilo canal between Celilo and Big Eddy, Ore.; seven of these are to be 65-foot spans and one 45 feet.

Diamond Forging & Mfg. Co., Pittsburgh, contemplates an addition to the plant at Delmont and Chateau streets and Ridge avenue, North side. The industrial development commission is familiar with the plans.

City officials, La Grange, Ky., are considering the proposals of Thomas R. Pullens, St. Louis, relative to establishing an iron and steel works at La Grange. This concern is said to be capitalized at $100,000.

Altoria Construction Co., 3 East Forty-fourth street, New York, has the general contract for a $1,000,000 18-story 118 x 118-foot hotel to be erected at Twelfth and Olive streets, St. Louis.

Clemmens & Bishop, Montesano, Wash., are considering the building of a logging railroad and the construction of two large sawmills near Sutherlin, Ore.

Kreolite Floors

A Positive Factor in the Cutting of Factory Costs

Kreolite Wood Block Floor in Plant of Vulcan Iron Works, Wilkesbarre, Pa.

IT is in shops of the class shown above that Kreolite Wood Block Floors demonstrate their ability to cut manufacturing and maintenance costs.

MANY iron working plants that give their floors hard severe wear have found it well worth while to investigate and install Kreolite Wood Block Floors.

NOTE the smooth, even surface of the Kreolite Wood Block Floor in the above view. Easy to truck over, comfortable to walk on, hence a decidedly good investment for any factory.

KREOLITE WOOD BLOCK FLOORS do not become cut or marred under such severe wear. They only become smoother and more compact, thus furnishing a better floor for trucking—a very important factor in keeping down factory costs.

KREOLITE WOOD BLOCK FLOORS are not special installations for selected departments, but are unequalled for all departments, including Loading Platforms, Foundries, Metal Stock-Rooms and Machine Shops containing high or low speed machinery.

THE AVERAGE Kreolite Wood Block Floor, receiving hard wear, has less than a 4% annual depreciation, a maintenance expense varying from ¼ to 1½%. What other flooring will give similar results?

Are you interested in labor saving and cost cutting factory floors?
A line today will bring interesting information

THE JENNISON-WRIGHT COMPANY

309 HURON STREET **TOLEDO, OHIO**

school; Vrydaugh & Wolf, McKeesport, architects.

McKEESPORT, PA.—F. W. Woolworth Co. will build a three-story, brick and steel building on Fifth avenue site; C. M. Wilson, Wilkesbarre, Pa., has plans.

NEWCASTLE, PA.—Bids received until 2 p. m., Nov. 10, for removal of substructure and building new bridge over Shenango river at Grant street, by superintendent public grounds and buildings, Harrisburg, Pa. Emil Swensson, Pittsburgh, has plans.

PHILADELPHIA. — American Galvanizing Co. has been incorporated; $10,000 capital stock; by Albert A. Friedmann, Mandel Hofkin, G. Eugene Harlan, Lionel Friedman.

PINEGROVE, PA.—Gray & Krouse, Philadelphia, has purchased ground and will erect a two-story brick, shoe factory.

PITTSBURGH.—Architects Boyd & Stewart let contract to Fetzer-Winger Co., for six-story warehouse on H. G. Morgan lot, Forbes street; reinforced concrete; $40,000.

PITTSBURGH.—Rosenbaum Co. will erect a five-story, reinforced concrete warehouse; Nicola Building Co., general contractor, letting sub-contracts.

PITTSBURGH.—Syria Improvement Association contemplates $300,000 brick and steel temple on Grant boulevard; Huehl, Schmid & Holmes, architects, Chicago, have plans.

PITTSBURGH.—Diamond Forging & Mfg. Co., contemplates addition to plant at Delmont and Chateau streets and Ridge avenue, North Side; industrial development commission familiar with plans.

READING, PA. — Richmond Radiator Co. will erect a one-story, 20 x 20-foot laboratory.

SHARON, PA.—New floor in State street bridge will be plank, instead of creosoted wood blocks, as previously announced.

SOUTH BETHLEHEM, PA. — Lehigh & New England railroad has received bids for new car shops at Windgap, Pa., and contracts soon will be let.

YORK, PA.—The Hench Drongold Co., Philadelphia street, has let contracts for construction of two-story, 80 x 160 and 80 x 240-foot addition, company manufactures agricultural implements.

ATLANTIC CITY, N. J.—Adjustable Sash Lock Co. has been incorporated; $100,000 capital stock; by Andrew Jacoby, J. William Alcorn, P. Schuldeufri, Atlantic City.

MILLVILLE, N. J.—Clyde Adams has plans for the Caloris Co.'s one-story, 70 x 160-foot, brick factory.

MILLVILLE, N. J. — Caloric Co., 2110 West Allegheny avenue, Philadelphia, will build a one-story, 70 x 160-foot plant in Millville.

NEWARK, N. J.—Pattern storage of Watts-Campbell Co. was damaged by fire Oct. 23.

NEWARK, N. J.—Frederick Kilgus will erect a four-story, addition to his factory on Seventh street.

NEWARK, N. J.—Chas. P. Baldwin, 45 Clinton street, is drawing plans for two-story, 45 x 90-foot plant, to be located on Sussex street, near Pennsylvania railroad; owner's name not announced.

PATERSON, N. J.—Banner Silk Mills have been incorporated; $100,000 capital stock; by Meyer Barnett, Michael Siena, Paterson; Harry Hein, New York.

PATERSON, N. J.—Globe Silk Mills has been incorporated; $100,000 capital stock; by Max Stein, Samuel Picon, Paterson; Anna Rand, Newark.

WILMINGTON, DEL. — Atlantic Rubber Co. has been incorporated to make engines, machines, etc.; $250,000 capital stock; by E. C. Boyd, N. P. Crouch, H. J. Joslyn, Wilmington.

WILMINGTON, DEL. — Pneumatic-Hub-Tire-Wheel Co. has been incorporated to make automobile wheels and tires; $500,000 capital stock; by G. J. Lampton, N. M. Rowland, L. C. Evans, Louisville, Ky.

WASHINGTON, D. C.—Averill & Adams are preparing plans for the Gyro Motor Co.'s three-story factory, at Seventh and Girard streets, to be used for the manufacture of aeroplane engines; estimated cost $15,000.

CENTRAL STATES

CINCINNATI.—Early & Daniels Co. has submitted plans for an $80,000 concrete and steel feedmill and warehouse to be located on West Sixth street.

CINCINNATI.—Bids will be opened Nov. 19 for the construction of a steel hull for the United States dredge Carrollton, which is used on the Kentucky river; estimated cost about $20,000.

CINCINNATI. — McClintic-Marshall Construction Co., Pittsburgh, has the contract for an addition to the sheet mill of the Newport Rolling Mill Co., Newport, Ky., a suburb of this city.

CINCINNATI. — Small amount of woodworking machinery will be required by C. C. Hobbs, who will build a planing mill at Madisonville road and Indian Hill avenue, Madisonville, a suburb of this city.

CINCINNATI. — Simmons Mfg. Co., iron and brass beds, has leased additional property at Sargeant and Carr streets, to enlarge its facilities; small amount of new equipment will be installed.

CINCINNATI.—H. Fening & Sons Co., maker of iron forgings, is receiving estimates for a two-story, 49 x 89-foot addition to its plant on Gest street, small amount of special equipment required.

CINCINNATI.—Thurber & Browning Construction Co. has been incorporated; $55,000 capital stock; by E. P. Browning, H. Thurber, E. Wolf, A. F. Browning, J. K. Browning.

CLEVELAND.—Jacob Babin, real estate operator, has plans for a seven-story commercial and light manufacturing building at Payne avenue and East Seventeenth street.

CLEVELAND.—United States Plate Co. has been incorporated to make engraver's supplies; $10,000 capital stock; by M. E. Meisel, C. N. Fiscus, B. C. Roberts, F. C. Raymond, R. P. Snyder.

EAST LIVERPOOL, O. — Lodge of Elks, No. 258, will build three-story club house; $60,000.

FREMONT, O.—County engineer is planning two bridges, one across Superior creek, between Madison and Scott townships, and the other over Snyder ditch.

MARTINS FERRY, O.—C. D. Keyser, Bellaire, O., has contract for three-story bank, office and store building for Peoples Savings Bank; Charles W. Bates, architect, Wheeling, has plans.

MIDDLETOWN, O.—C. E. Brigel, Cincinnati Metal Pump Co., is negotiating with the Business Men's Club with the idea of bringing the plant to Middletown.

MIDDLETOWN, O.— Commissioners have awarded to C. C. Ummel, Trenton, O., the contract for a 90-foot steel bridge in Reiley township, at his bid of $4,400

NEW LEXINGTON, O.—Clyde M. Foraker, county auditor, says county commissioners have decided to proceed with the erection of the Jonathan creek bridge.

PEMBERVILLE, O. — Village has sold $9,000 bonds for the erection of an electric light plant; Engineer Froehlick, Toledo, O., says the council has arranged to buy necessary wire and hardware at once.

SPRINGFIELD, O.—Architect Robert C. Gowalt has prepared plans for a two-story, 20 x 90-foot brick addition to the Nolte Brass Co.

TOLEDO, O.—W. E. Stroud, Los Angeles, Cal., and S. H. Burt, owner of the Jefferson hotel, has decided to construct a $400,000 fireproof hotel to replace the Jefferson; structure will be 11 or 12 stories; reinforced concrete.

WELLSVILLE, O.—Bids will be taken soon for a municipal lighting plant, the equipment for which will cost about $60,000.

WEIRTON, W. VA.—Phelps Can Co. has let contract for construction of one-story, 100 x 160-foot can manufacturing plant.

SOUTHERN STATES

HARRISON, ARK.—Harrison Ice & Storage Co. has been incorporated; $25,000 capital stock; by W. L. and M. R. Fellows.

WARTRACE, TENN. — Carnett Brothers Sulkey Plow Co. plans to erect a plant; machinery bids will be received until Dec. 12.

WESTERN STATES

MISSOULA, MONT. — County will vote Nov. 3 on $40,000 bridge bonds; W. J. Babington, county clerk.

SIDNEY, MONT.—Sidney Light & Water Co. has been incorporated; $50,000; by R. H. Watson, et al.

BOISE, IDA.—Natural Hot Water Co. has filed articles of incorporation and plans to install a pipe line throughout the city.

BOISE, IDA.— People's Milling & Elevator Association has filed articles for $100,000 and plans a chain of flour mills to be constructed soon; J. W. Hearson is secretary and C. E. Meyer, Twin Falls, president.

COUNCIL, IDA.—Adams county will vote Nov. 3 on $25,000 bond for the construction of a court house and jail; C. W. Holmes, county clerk.

PAYETTE,—City will vote Nov. 14 on $6,000 for the installation of a filtration plant in the water system.

EVERETT, WASH.—Weyerhaeuser Lumber Co. will close its mill in December for overhauling; improvements include the installation of a steel refuse burner.

SEATTLE.—Board of public works will receive bids until Nov. 13 for furnishing the city lighting department with one year's supply of distribution transformers.

CARLTON, ORE.—Charles E. Ladd will rebuild the Carlton Fir Lumber Co.'s mill destroyed by fire; it will have a daily capacity of 2,000 feet.

PORTLAND.—Bids for the purchase of $250,000 interstate bridge bonds will be opened by the bridge bonding committee Nov. 9.

PORTLAND. — U. S. Engineers, Couch building, wll receive bids until Dec. 7 for eight steel swing bridges across the Dalles-Celilo canal between Celilo and Big Eddy, Ore.; seven of these are to be 65-foot spans and one 45 feet.

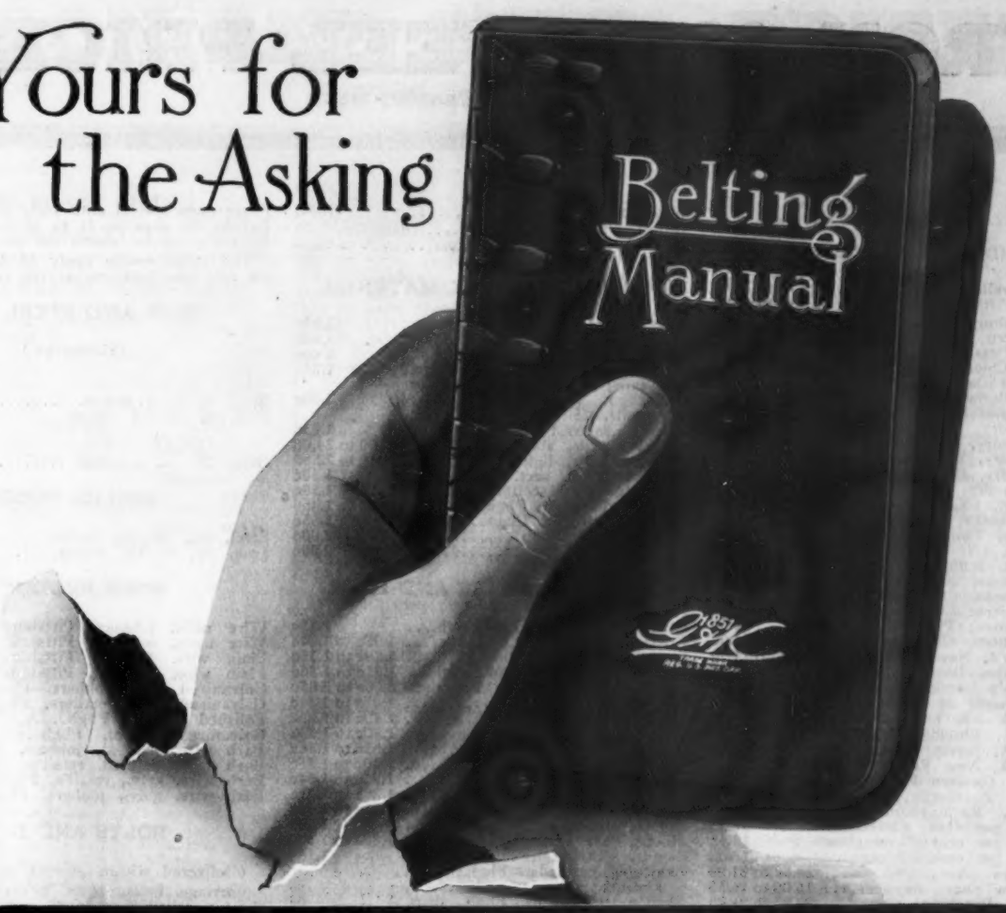
SUTHERLIN, ORE.—Clemmens & Bishop, Montesano, Wash., are considering the building of logging railroads and the construction of two large sawmills to handle timber east of Sutherlin.

LOS ANGELES.—American Breakshoe & Foundry Co. will start erecting a $250,000 plant at Vernon, Cal., within the next few months.

SAN FRANCISCO.—United Electric Co. of California has been incorporated to make electrical machinery, devices, etc.; $10,000 capital stock; by G. E. Campbell, P. Santioemma, F. F. McDougal.

SAN FRANCISCO.—Inlaid Floor Co., maker, has been incorporated; $25,000 capital stock; by J. M. Reynolds, A. and F. J. Gustafson, R. Enzlin, A. Strandberg, D. G. Hanchett.

Yours for the Asking



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It gets right down to rock bottom principles—every one of its 96 pages is a veritable nugget of invaluable information, suggestions, mechanical rules, tables, etc.

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IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery This Year.)

Bessemer, valley	$13.75 to 14.00
Bessemer, Pittsburgh	14.70 to 14.95
Basic, Pittsburgh	13.45
Basic, eastern Pa.	14.00
Malleable, Pittsburgh	13.70 to 13.95
Malleable, Chicago	13.00 to 13.50
Malleable, Philadelphia	14.50 to 15.00
Malleable, Buffalo	12.00 to 12.50
No. 1X Philadelphia	14.75 to 15.00
No. 2 foundry, Pittsburgh	13.70 to 13.95
No. 2 foundry, Cleveland	13.50 to 13.75
No. 2 foundry, Ironton	13.00 to 13.50
No. 2 foundry, Chicago	13.00 to 13.50
No. 2X foundry, Philadelphia	14.50 to 14.75
No. 2X fdy., (N. J. tidewater)	14.00 to 14.25
No. 2X foundry, Buffalo	12.00 to 12.50
No. 2 plain, Philadelphia	14.25 to 14.50
No. 2 plain, (N. J. tidewater)	13.75 to 14.00
No. 2 plain, Buffalo	12.00 to 12.25
No. 2 southern, Birmingham	10.00
No. 2 southern, Cincinnati	12.90
No. 2 southern, Chicago	14.00 to 14.25
No. 2 southern, Phila. delivery	14.50
No. 2 southern, Cleveland	14.00
No. 2 south'n, New York, docks	14.25 to 14.50
No. 2 southern Boston, docks	14.25 to 14.50
No. 2 south'n interior New Eng.	15.00 to 16.00
No. 2 southern, St. Louis	14.00 to 14.25
Virginia No. 2X furnace	12.25 to 12.75
Virginia 2X, Philadelphia	15.00 to 15.25
Virginia, 2X, Jersey City	15.25 to 15.50
Virginia, 2X, New Eng. interior	16.00 to 16.25
Gray forge, (eastern Pa.)	13.50 to 13.75
Gray forge, Pittsburgh	13.45 to 13.70
Gray forge, Birmingham	9.00 to 9.50
Silveries, 8 per cent, Cleveland	17.55
Silveries, 5 per cent Birmingh'm	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	20.50 to 21.00
Lebanon low phos., furnace	16.00 to 16.50
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 16.75
Charcoal, Birmingham	25.00

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	7c
Foreign non-Bess., 50 to 65 per cent	7c

COKE

(At the ovens.)

Connellsville furnace	$1.60 to 1.75
Connellsville fur. contr.	1.65 to 1.75
Connellsville foundry	2.15 to 2.40
Connellsville fdy., contr.	2.25 to 2.50
Wise county furnace	1.75 to 2.00
Wise county foundry	2.10 to 2.40
Pocahontas furnace	1.75 to 2.00
Pocahontas foundry	2.00 to 2.25
New River, foundry	2.50 to 3.00
New River, furnace	2.00 to 2.25

FERRO-ALLOYS

Ferro-manganese, Baltimore	$67.50 to 68.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Open-hearth billets, Phila.	$21.40 to 21.90
Forging billets, Phila.	24.40 to 25.40
Forging billets, Pbgh. (nom.)	25.00
Wire rods, Pittsburgh	$26.00
Billets, Pbgh. and Ygnst.	$19.00 to 19.50
Sheet bars, Pbgh. and Ygnst.	20.00 to 20.50

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh. base	1.50c
Angle bars, st. sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.40c to 1.45c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh.	2.00c
Track bolts, Chgo.	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.15c
Structural shapes, Chicago	1.25c to 1.34c
Structural shapes, Philadelphia	1.30c to 1.35c
Structural shapes, New York	1.31c to 1.36c
Structural shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.25c to 1.34c
Tank plates, Pittsburgh	1.10c to 1.20c
Tank plates, Philadelphia	1.30c to 1.35c
Tank plates, New York	1.31c to 1.36c
Bars, soft steel, Pittsburgh	1.10c to 1.15c
Bars, soft steel, Chicago	1.25c to 1.34c
Bars, soft steel, Philadelphia	1.30c to 1.35c
Bars, soft steel, New York	1.31c to 1.36c
Hoops, carloads, Pittsburgh	1.25c
Hoops, less carloads, Pittsburgh	1.30c to 1.35c
Bands, Pittsburgh	1.15c
Shafting, carloads, Pbgh., disc. contract	66
Shaft'g less carl'ds, Pbgh., disc.	63
Bar iron, Chicago	1.00c to 1.05c
Bar iron, Philadelphia	1.17c to 1.22c
Bar iron, New York	1.15c to 1.20c
Bar iron, Cleveland	1.20c
Bar iron, Pittsburgh	1.20c
Hard steel bars, Chicago	1.25c to 1.30c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.90c to 2.00c
No. 28, black, Chicago	1.99c to 2.09c
No. 28, tin mill, black, Pbgh.	1.95c
No. 28, galvanized, Pbgh.	2.90c to 3.00c
No. 28, galvanized, Chgo.	2.99c to 3.09c
No. 10, blue, annealed, Pbgh.	1.40c to 1.45c
No. 10, blue, annealed, Phila.	1.60c
Tin plate, 100 lb., coke, base	$3.25 to 3.40

MISCELLANEOUS SHOP TOOLS

	Discount.
Standard files	80 and 5
Heavy hammers, 3 to 5 lb.	80 and 10
Heavy hammers, over 5 lb.	80 and 5
Gas pliers, 7-inch, per dozen	$2.00
Gas pliers, 12-inch, per dozen	3.50
Cold chisels, per pound	10c to 15c
Wrenches, aligator, discount	75 to 80
Wrenches, drop forged S.	60

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll., and re-an.	30 cents
Hot roll'd, pickl'd and ann., tin mill	25 cents
Full pickled, cold rolled and re-ann.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller levelling	10 cents
Patent levelling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open hearth steamping steel, free from mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black Butt-weld.	Galv. Butt-weld.
Steel, ¾ to 3 inches	81	72½
Iron, ¾ to 2½ inches	70	61
	Lap-weld.	
Stele, 2½ to 6 inches	80	71½

BOILER TUBES

Steel, 3½ to 4½ inches	73
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.60
Wire nails, retailers, Pittsburgh	1.65
Plain wire, jobbers, Pittsburgh	1.40
Plain wire, retailers, Pittsburgh	1.45
Galvanized wire, jobbers, Pbgh.	1.80
Galvanized wire, retailers, Pbgh.	1.85
Polished staples, Pbgh.	1.60
Galvanized staples, Pbgh.	2.00
Barb wire, painted, jobbers, Pbgh.	1.60
Barb wire, painted, retail'rs, Pbgh.	1.65
Barb wire, galv., retail's, Pbgh.	2.05
Barb wire, galv., jobbers, Pbgh.	2.00

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads 80 and 15; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 80 and 25.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, c. and t. square, blank or tapped, $6 off; hexagon, blank or tapped, ⅜ inch and larger, $7.20; ⅜-inch and smaller, $7.80.

RIVETS

Structural rivets, Pbgh.	1.45c to 1.50c
Structural rivets, Chgo.	1.68c
Boiler rivets, Pbgh.	1.55c to 1.60c
Boiler rivets, Chgo.	1.78c

SCREWS

(New York.)

Lag, gimlet and cone point	80 and 20
Coach, gimlet point	80
Standard Jack	70 and 10
Mch., cut thread, flat head	50 and 10
Mach., cut threal, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and 40 and 10
Mch. rolled thread, flat head or round head	80 and 10
Set screws, iron	75 and 10 and 10
Set screws, steel, per cent advance over iron	25
Square head cap screws	70 and 10 and 10
Hexagon head cap screws	70 and 10 and 10
Fillister head cap screws	60 and 10 and 10
Flat head wood screws	10 and 10 and 5
Round head wood screws	10 and 10 and 5

WROUGHT STEEL CAR WHEELS

33-inch engine truck wheels	$22.50
36-inch engine truck wheels	23.50
33-inch tender wheels	18.50
36-inch passenger train car and tender wheels	21.50
33-inch freight car wheels	15.50

All with standard 2½ inch rims and minimum standard hubs, usual extras applying for thicker rims and larger hubs; all f. o. b. cars, Pittsburgh.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

¼-inch and larger	1.25c
5/16-inch	1.30c
½-inch	1.35c
5/8-inch	1.50c
¼-inch	1.75c

TACKS

(New York.)

	Discount.
American carpet tacks.	90 and 20 and 10 and 10
American cut tacks...	90 and 20 and 10 and 10
Railroad tacks	90 and 50 and 10
Gimp tacks	90 and 20 and 10 and 10
Finishing nails	70

WIRE ROPE

Galvanized, iron and steel	47½ and 2½
Bright, iron and steel	55 and 2½

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

Base price Cut to length		0.10 to 0.19 Carbon
Hard.	Soft.	1½ in. and wider.
2.85	3.10	0.100 and thicker.
2.95	3.20	0.050 to 0.099 inc.
3.10	3.35	0.035 to 0.049 inc.
3.35	3.75	0.031 to 0.034 inc.
3.60	4.00	0.025 to 0.030 inc.
3.80	4.20	0.020 to 0.024 inc.
4.70	5.20	0.017 to 0.019 inc.
5.10	5.60	0.015 and 0.016
5.95	6.45	0.013 and 0.014
6.55	7.05	0.012
6.90	7.40	0.011
7.25	7.75	0.010
Coils		
2.75	3.00	0.100 and thicker
2.80	3.05	0.050 to 0.099 inc.
2.95	3.20	0.035 to 0.049 inc.
3.10	3.50	0.031 to 0.034 inc.
3.20	3.60	0.025 to 0.030 inc.
3.30	3.70	0.020 to 0.024 inc.
3.60	4.10	0.017 to 0.019 inc.
4.00	4.50	0.015 and 0.016
4.70	5.20	0.013 and 0.014
5.05	5.55	0.012
5.40	5.90	0.011
5.75	6.25	0.010

CAST IRON PIPE

Three to 20 in., Cleveland	$21.50
Twenty-four to 48-inch, Cleveland	21.00
Four-inch, water, Chicago	26.00
Six to 12 inches, Chicago	24.00
Larger sizes, Chicago	23.50
Six-inch, water, New York	20.50 to 21.00
Four-inch, water, Birmingham	19.50
Six-inch and larger, Birmingham.	19.50
Gas pipe, $1 per ton higher than water.	

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.70c to 1.85c
Steel bars, Philadelphia	1.70c to 1.75c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.65c to 1.75c
Iron bars, Philadelphia	1.70c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.80c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia.	1.70c to 1.75c
Shapes and plates, New York	1.85c
No. 10 blue ann. sheets, Chgo	1.95c
No. 10 blue ann. sheets, Cleve	2.05c
No. 10 blue ann. sh., St. Louis.	2.00c
No. 10 blue ann. sheets, Cinci	1.95c
No. 28 black sheets, Chgo	2.55c
No. 28, black sheets, Cleveland.	2.45c
No. 28 black sheets, Cincinnati.	2.45c to 2.55c
No. 28 black sh., St. Louis	2.55c
No. 28 galv. sheets, Chgo	3.55c
No. 28 galv. sheets, Cleveland	3.35c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c
No. 28 galv. sheets, St. Louis	3.55c

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo.	$ 7.50 to 7.75
No. 1 railroad wrought, Cleve.	9.50 to 10.00
No. 1 railroad wrought, St. L.	7.25 to 7.50
No. 1 railroad wrought, Cinci.	8.00 to 8.50
No. 2 railroad wrought, Chgo.	7.25 to 7.50
No. 2 railroad wrought, St. L.	7.00 to 7.25
Arch bars and transoms, Chgo.	10.75 to 11.25
Arch bars and transoms, St. L.	10.50 to 11.00
Knuckles, coup. & spr'gs, Chgo.	9.00 to 9.25
Knuckles, coup. & spr'gs, St. L.	8.25 to 8.50
Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	12.50 to 13.00
Steel car axles, Chgo.	10.50 to 11.00
Steel car axles, St. Louis	10.25 to 10.50
Locomotive tires, Chicago	9.00 to 9.50
Locomotive tires, St. Louis	8.25 to 8.75
Cut forge, Chicago	7.25 to 7.50
Pipes and flues, Chicago	$ 5.75 to 6.00

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds to:—	
New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11.6 cents
Baltimore	14½ cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama can'l	41 cents

Pipes and flues, Cleveland	7.25 to 7.75
Pipes and flues, St. Louis	5.25 to 5.50
No. 1 cast, Chicago	9.25 to 9.50
No. 1 cast, Cleveland	9.50 to 10.00
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	9.00 to 9.50
No. 1 busheling, Chicago	6.50 to 6.75
No. 1 busheling, Cleveland	8.00 to 8.25
No. 1 busheling, Cincinnati	5.75 to 6.25
No. 1 busheling, St. Louis	6.75 to 7.00
No. 2 busheling, Chicago	5.25 to 5.75
No. 1 boiler plate, cut Chgo.	6.25 to 6.75
No. 1 boiler plate, cut, Buffalo.	9.00 to 9.50
No. 1 boiler plate, cut, St. L.	5.50 to 6.00
Boiler punchings, Chicago	8.25 to 8.75
Cast borings, Chicago	4.75 to 5.00
Cast borings, Cleveland	5.50 to 6.00
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	3.50 to 4.00
Machine shop turnings, Chgo.	4.50 to 4.75
Machine shop turnings, Cleve.	5.25 to 5.50
Machine shop turnings, Cinci.	4.25 to 4.75
Machine shop turnings, St. L.	4.00 to 4.50
Malleable agl., Chicago	7.75 to 8.25
Malleable agricultural, St. Louis.	6.25 to 6.50
Malleable, railroad, Chicago	7.75 to 8.25
Malleable, railroad, Cincinnati	6.50 to 7.00
Malleable, railroad, St. Louis	6.25 to 6.50
Angle bars, iron, Chgo.	10.75 to 11.00
Angle bars, iron, St. Louis	9.50 to 10.00
Angle bars, steel, Chgo.	7.75 to 8.00
Angle bars, stel, St. Louis	8.75 to 9.00
Stove plate, Chicago	8.50 to 8.75
Stove plate, Cleveland	7.50
Stove plate, Buffalo	9.00 to 9.75
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	8.25 to 8.75
Bundled sheet, Cincinnati	4.00 to 4.50
Wrought iron pil'g plates, Clev.	13.00

(Gross. Tons.)

Heavy melting steel, Pbgh.	$10.25 to 10.50
Heavy melting steel, Buffalo	10.00 to 10.50
Heavy melting steel, Chicago	8.50 to 9.00
Heavy melting steel, Cleveland.	8.75 to 9.25
Heavy melting steel, Cincinnati	9.00 to 9.50
H'vy melting steel, eastern Pa.	9.50
Heavy melting steel, New York.	7.50 to 7.75
Heavy melting steel, St. Louis.	10.50 to 11.00
Bundled sheet, Buffalo	6.25 to 6.50
Grate bars, Buffalo	9.00 to 9.25
Grate bars, New York	6.50 to 7.00
No. 1 railroad wr'ght, east. Pa.	11.00 to 11.50
No. 1 railroad wrought, Pbgh.	10.25 to 10.50
No. 1 R. R. wght., New York.	9.00 to 9.50
No. 1 R. R. wrought, Buffalo.	10.00 to 10.50
Shafting, New York	12.00 to 12.50
Wrought pipe, New York	7.25 to 7.50
Wrought pipe, eastern Pa.	9.25 to 9.75
Mch. shop turnings, New York.	5.00 to 5.25
Machine shop turnings, Buffalo.	5.50 to 6.00
Mch. shop turnings, Pbgh.	7.85 to 8.00
Mch. shop turnings, eastern Pa.	7.75 to 8.00
Cast borings, New York	5.00 to 5.25
Cast borings, eastern Pa.	7.75 to 8.00
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.00 to 8.50
Stove plate, (Jersey points)	8.00 to 8.50
Stove plate, Pittsburgh	9.00
Stove plate, eastern Pa.	8.00 to 8.50
Shoveling steel, Chicago	7.25 to 8.00
Shoveling steel, St. Louis	7.50 to 7.75
Reroll'g rails, 5 ft. & ov., Pbgh.	13.00
Reroll. rails, 5 ft. & ov., Chgo.	9.75 to 10.00
Reroll. rails, 5 ft. & ov., Cleve.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., St. L.	10.00 to 10.25
Steel rails, short, Chicago	10.00 to 10.25
Steel rails, short, Cleveland	11.50 to 12.00
Steel rails, short, St. Louis	9.50 to 9.75
Iron rails, Cleveland nom.	11.75 to 12.00
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa.	13.50 to 14.00
Iron rails, St. Louis	10.00 to 10.25
Iron rails, Pittsburgh	13.00 to 13.50
Frogs, switches, guards, Chgo.	8.75 to 9.25
Frogs, switches & g'rds, St. L.	9.25 to 9.50
Car wheels, (iron), Pittsburgh.	11.50 to 11.75
Car wheels, (steel), Pittsburgh.	12.75 to 13.00
Car wheels, Chicago	10.00 to 10.25
Car wheels, eastern Pa.	10.00
Car wheels, Buffalo	10.50 to 11.00
Car wheels, (N. J. points)	9.25 to 9.50
Car wheels, St. Louis	10.00 to 10.25
Iron axles, Pittsburgh	20.00 to 21.00
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	18.50 to 19.00
Iron axles, Buffalo	19.00 to 19.50
Iron axles, Chicago	15.50 to 15.75
Steel car axles, New York	12.00 to 12.50
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	13.50 to 14.00
Steel car axles, eastern Pa.	13.00 to 13.50
No. 1 busheling, Buffalo	8.25 to 8.75
No. 1 busheling, Pittsburgh	9.00
No. 2 busheling, Buffalo	5.75 to 6.25
Low phosphorus steel, Buffalo.	14.00 to 14.50
Low phosphorus steel, Pbgh.	14.00 to 14.50
Low phos. steel, eastern Pa.	13.50 to 14.00
No. 1 forge, eastern Pa.	8.00 to 8.25
No. 1 cast, eastern Pa.	11.00 to 11.50
No. 1 cast, Pittsburgh	11.00 to 11.50
No. 1 heavy cast (N. J. points)	10.50 to 11.00
Boiler plate, Cleveland	8.50 to 9.00
Mall. iron, agricul., Cleveland.	9.00 to 9.50
Mall. iron R. R., Cleveland	9.25 to 9.75
Malleable, railroad, Pittsburgh.	9.50 to 10.00
Mall. R. R., Buffalo	9.25 to 9.75
Mall. R. R. east. Pa.	9.00 to 9.50
Bundled sheet, Pittsburgh	8.50 to 8.75
Bundled sheet, Cleveland	7.50 to 8.00

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Some Experiments on Oxygen Cutting

(*Continued from page 867*)

per cent. In the experiments, several other cuts were made both with and without pre-heating; but I have omitted them as the cuts produced were not normal ones. The record gives the average oxygen consumptions for the individual cuts of the two classes—those involving unheated and those involving heated oxygen—which include these abnormal cuts.

Second Series of Tests

The foregoing results are confirmed by a second series of experiments, the type of torch remaining the same. The thickness of the plate was here 0.37 inch. The oxygen pressure for these thin sheets was reduced to about 14.7 pounds per square inch. The acetylene pressure was such as to enable 1 foot to be cut with about 0.32 cubic feet of the gas. The purity of the oxygen was the same as before—96.5 per cent. The following table makes clear the results for the normal cuts, with "cold" oxygen:

Length of cut in inches.	Time in minutes.	Time in minutes for 1 linear foot.
39.4	2.42	0.74
39.4	2.75	0.84
39.4	2.67	0.81
39.4	2.67	0.81
39.4	2.50	0.76
39.4	2.42	0.74
39.4	2.58	0.79
39.4	2.42	0.74
39.4	2.33	0.71
Average		0.77

With the oxygen pre-heated, the results are as follows:

Length of cut in inches.	Time in minutes.	Time in minutes for 1 linear foot.
39.4	2.05	0.63
39.4	2.17	0.66
39.4	2.05	0.63
39.4	2.12	0.65
39.4	2.17	0.66
39.4	2.42	0.74
39.4	2.18	0.66
39.4	2.03	0.62
39.4	2.42	0.74
Average		0.67

The saving in time here amounts to 13 per cent. Omitting, as before, the cases of abnormal cuts and assuming the oxygen consumption to remain the same on the average, we have an oxygen consumption of 0.139 cubic feet per square inch of cut when the oxygen was not pre-heated, and of 0.118 cubic feet when the oxygen was pre-heated. That is, there was an actual saving of oxygen of 0.021 cubic feet per square inch of cut—or 15 per cent. It should be borne in mind that any saving of time means a saving of labor as well.

Quite a number of experiments have been tried where the object in view was to gain information regarding speed variations resulting from changes in the character of the heating part of the flame. Open-hearth steel having a thickness of 1.18 inches was used. The torch was an oxy-hydrogen instrument having the heating jet separated from the cutting jet. The oxygen was 99 per cent pure. The oxygen pressure was about 22 pounds per square inch. The hydrogen and oxygen were kept pretty closely to the ratio 4:1, but the pressures were varied. The results show that with low pressure the time required to effect the cutting was comparatively large. As the pressures were increased, the time required per linear unit of cut diminished. The best results seem to have been obtained when the pressures were rather heavy and where the relative amount of hydrogen fell off a little. With these cuts, the ratio of hydrogen and oxygen was in fact 15:4. The excellent results are, however,

rather to be attributed to the heavy flame maintained. The five cuts were made not only more rapidly than with lesser pressures, but were apparently finer examples of cutting. The following table gives details:

Length of cut in inches.	Time in seconds.	Time in minutes for 1 linear foot.
41.3	270	1.26
41.3	270	1.26
32.7	215	1.31
31.5	185	1.17
29.5	202	1.37
Average		1.27

Another series of six cuts was made with the same size and type of torch, but upon heavier steel—that is, upon plate 2.56 inches thick. The oxygen was, however, only 96.5 per cent pure. The oxygen pressure was about 29.5 pounds per square inch. The following table exhibits details:

Length of cut in inches.	Time in seconds.	Time in minutes for 1 linear foot.
6.7	75	2.24
6.7	70	2.09
6.7	72	2.15
6.7	65	1.94
6.7	70	2.09
6.7	90	2.69
Average		2.20

These results would seem to have been very good ones. The steel was more than twice as thick as in the preceding series of cuts and there must have been a greater proportionate loss in getting under way because of the short run of only 6.7 inches. The hydrogen-oxygen ratio in the heating flame was here 35:8—or something in excess of 4:1, the regulation ratio.

Effect of Pressure of Cutting Oxygen Upon Speed

One further question remains to be considered. It is usual to employ a considerable pressure back of the cutting jet of oxygen. What advantage lies in a heavy pressure, and are there limits to the advantage, if such exists? These are important practical questions. Quite a number of experiments have been carried out whose results will help to their answer. In the following table, all except possibly the two lighter pressures represent groups of experiments. The average results are given. The oxygen used in these experiments was 99 per cent pure. The plates were 1.18 inches thick. The torch was of the oxy-hydrogen type, and consumed in its heating jet 63.5 cubic feet of hydrogen per hour and 17 cubic feet of oxygen. It will be noted that this ratio 63.5:17 is a little short of 4:1. The tabular results follow:

Pressure of cutting oxygen.	Length of cut in inches.	Time in seconds.	Time in minutes per linear foot of cut.
7.1	26.0	330	2.54
10.6	35.0	340	1.94
24.8	25.3	211	1.69
35.5	37.5	235	1.27
49.7	41.7	236	1.13

We see here that the speed of cutting increased steadily with the increase of pressure. However, the highest pressure produced a cut with the upper edge rounded. The pressure of 35.5 pounds seems to be about the proper maximum pressure to produce a perfect cut in the most rapid manner. It should be added that not only did the lower pressures correspond to slow cutting, but the work itself was faulty.

The American Rolling Mill Co., Middletown, O., has published an address entitled "The Contribution of Science to the Production of High Quality Rust-Resisting Metal", which was delivered by Dr. Allerton S. Cushman before the Armco Club, Middletown. The address is of interest to anyone concerned with the problems surrounding the prevention of corrosion.

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